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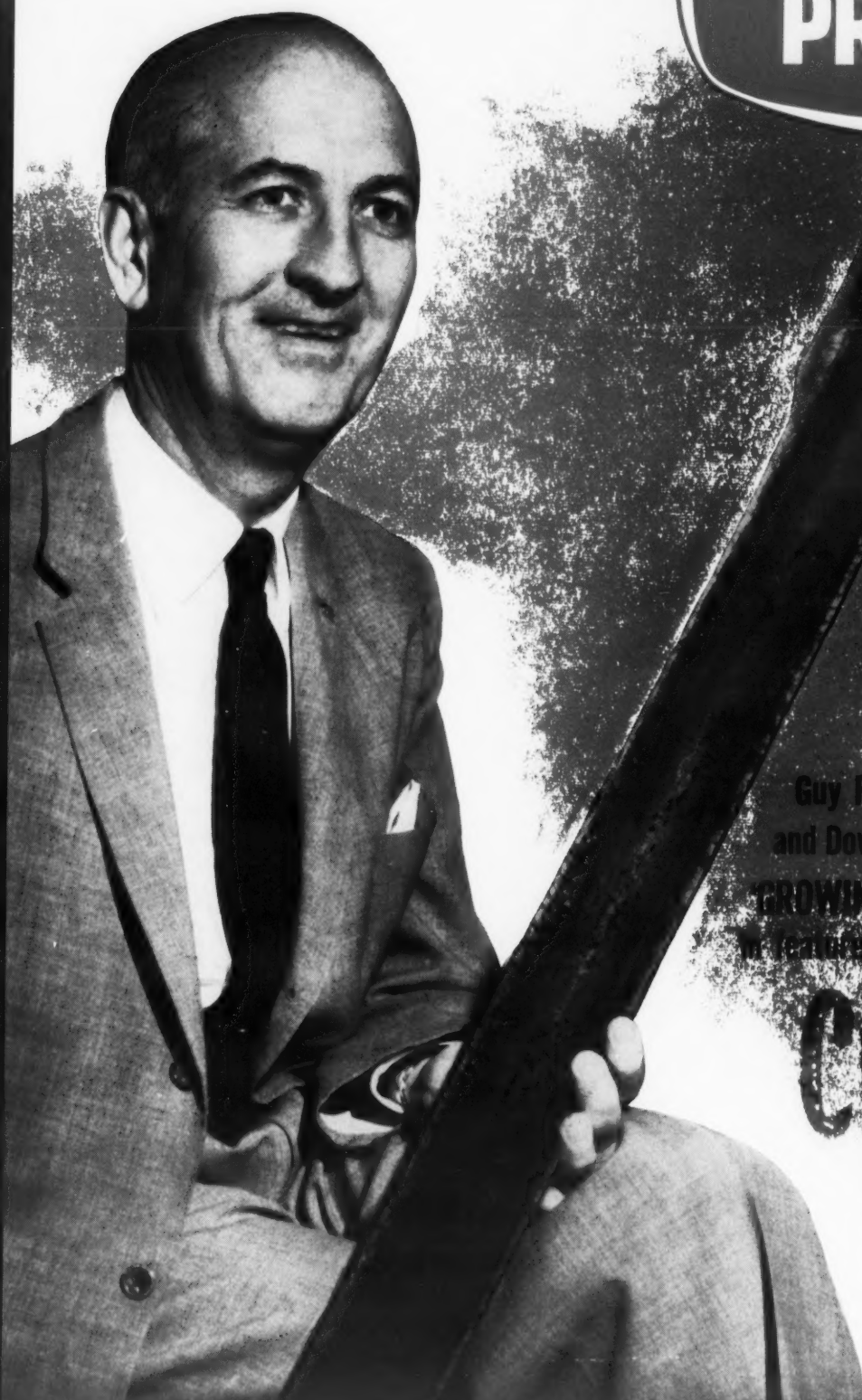
- more than 250 concise reports on . . .
- new processing techniques • chemicals
- instruments • equipment

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JULY 1959



CHEMICAL PROCESSING



Guy F. WILLIAMS, NACE Director
and Dowell Corrosion Engineer, discusses
GROWING NEED for CORROSION CONTROL
in feature on fighting —

CORROSION

page 70

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on SULFAN[®] stabilized sulfuric anhydride



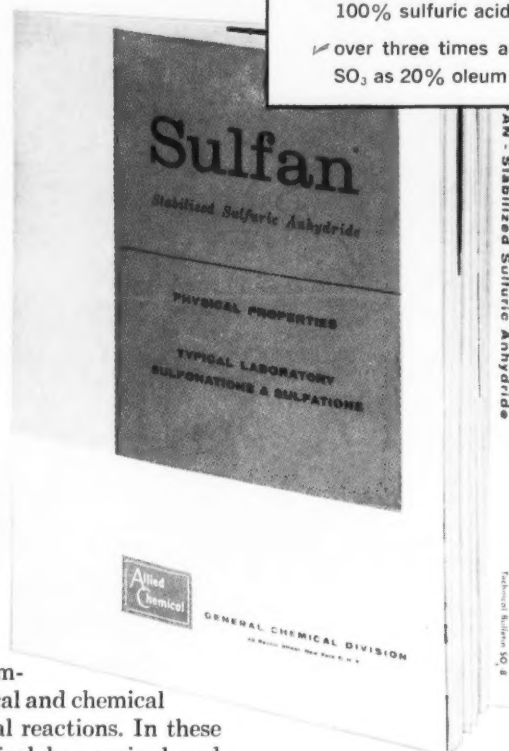
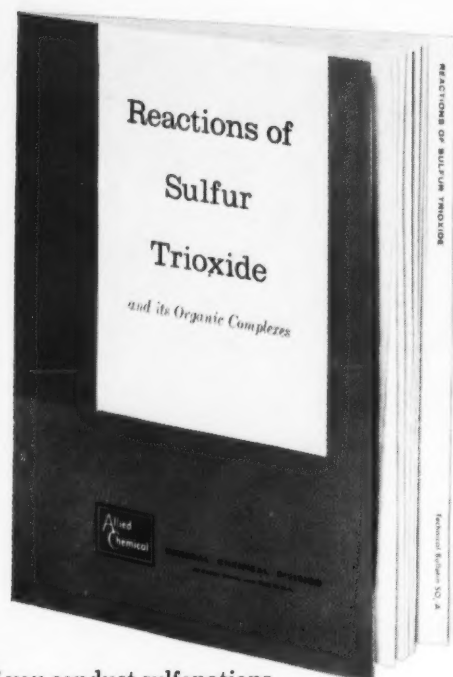
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and exhibits

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July 13-17. Gordon Research Conference, Organic Reactions and Processes, New Hampton School, New Hampton, N.H.

July 27-31. Gordon Research Conference, Chemistry at Interfaces, Kimball Union Academy, Meriden, N.H.

August 10-14. Gordon Research Conference, Elastomers, Colby Junior College, New London, N.H.

August 18-21. Western Electronic Show and Convention, Industrial Design Competition, Cow Palace, San Francisco.

September 7-11. Ion Exchange Conference, Mountain View Hotel, Gatlinburg, Tenn.

September 10-11. 2nd International Air Pollution Congress, American Society of Mechanical Engineers, Statler Hilton Hotel, New York, New York.

September 10-11. Society of Plastics Industry, Midwest Conference, French Lick, Indiana.

September 17-20. Drug, Chemical and Allied Trades Section, New York Board of Trade, 69th Annual Meeting, Sagamore Hotel, Bolton Landing, Lake George, N.Y.

September 20-22. Chemical Market Research Association, Textile Fibers—Yesterday and Today, Williamsburg, Virginia.

September 21-25. 14th Annual Instrument-Automation Conference and Exhibit, International Amphitheatre, Chicago, Illinois.

October 20-24. Federation of Paint and Varnish Production Clubs, 37th Annual Meeting and the 24th Paint Industries' Show, Convention Hall, Atlantic City.

November 30-December 4. 1959 Exposition of Chemical Industry, Coliseum, New York City.

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THAT'S
INTERESTING

**Hit poisoning
on new front**

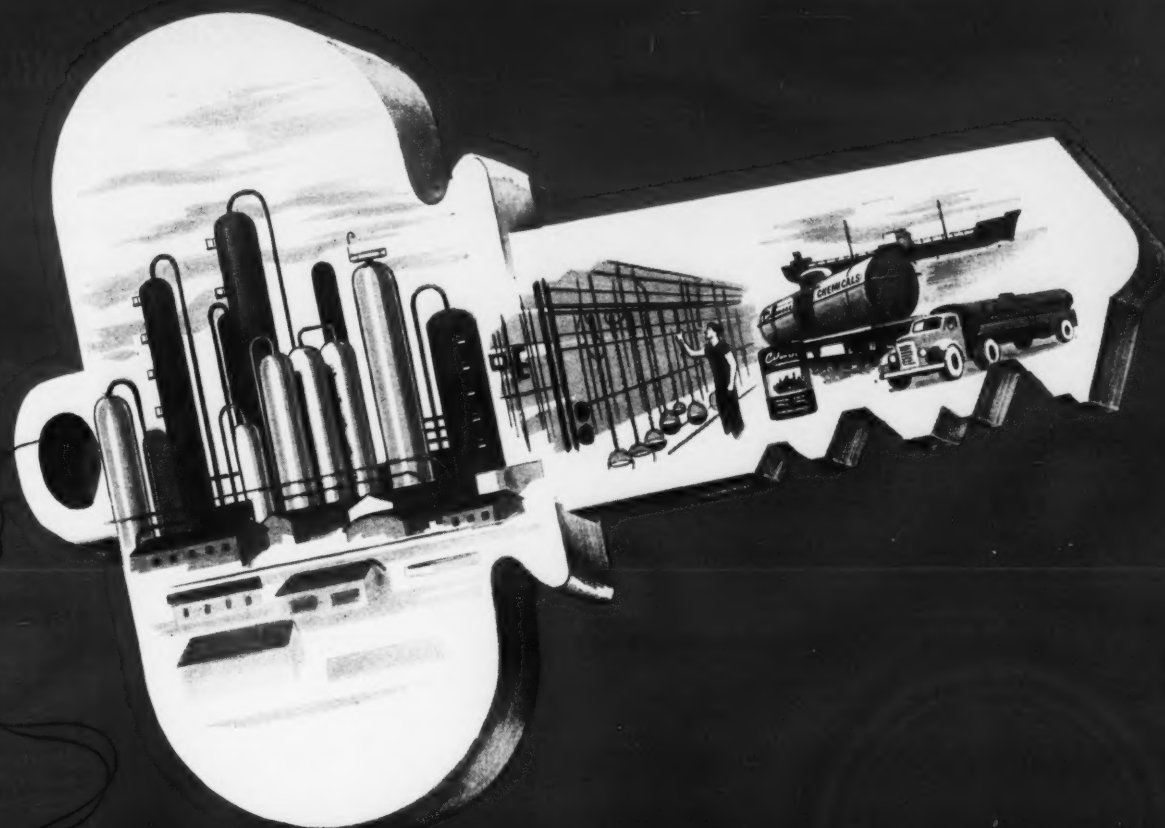
A 2½-year study of the toxic effects of carbon tetrachloride by two University of Michigan scientists may lead to improved treatment of persons poisoned by chlorinated hydrocarbons.

Such compounds were found not to be poisonous in themselves, but they trigger a massive and prolonged discharge of adrenaline within the body, causing an upset which can prove fatal.

The researchers found carbon tetrachloride affects the brain, which then orders a wholesale discharge of adrenaline.

Somehow, this breaks down stored fat in the body and fills the bloodstream with fatty acids. Blood flow to the liver is impaired so that organ cannot function normally. If this process is not corrected, the poisoning will prove fatal.

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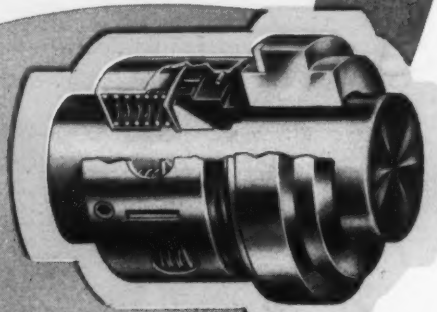
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CHEMICAL PROCESSING.

with which is combined
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and Chemical Business

For the management team

More than 50,000 copies of this issue

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July 1959

No. 7

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CHEMICAL PROCESSING



Keeping the Iron Curtain from rusting

As Guy Williams points out in his article leading off our feature on corrosion control this month on page 71 — the battle against corrosion has become of even more importance than it was in the past.

Besides prevention of billions of dollars in waste, corrosion control is now needed for missile work, atomic energy, and computers. As Russia trains corrosion engineers and develops corrosion technology to keep their side of the Iron Curtain from rusting, we must do the same and even better.

CHEMICAL PROCESSING has recognized the importance of corrosion control ever since its founding in 1938. For the past six years we have carried a regular monthly section called Corrosion Control, which is expanded to a feature once a year.

In the July 1959 feature in this issue, a variety of different ways to attack corrosion are presented — such as the article on Pfizer's experience with stainless steel, page 77 — cathodic protection, page 86 — Corrosion Keys on PVC pipe, page 101 — and condensations of technical papers on titanium, zirconium, clad alloys, and catalytic decomposition, starting on page 92.

In August our regular Corrosion Control section continues with an opening feature on microbiological corrosion.

Gordon Weyermüller

Associate Editor



How To Break a TARSET® Bond!

IF YOU ever really *want* to remove TARSET, sand-blasting is the most practical method, of course. Our point is that TARSET *does* hold like a bulldog to surfaces, even under water! And a tight, long-lasting bond is an important consideration when you're tackling a tough corrosion problem. For most coating failures begin when a single area of coating separates, cracks and admits moisture.

Remember these other important facts about TARSET:

There is only *one* TARSET coal tar-epoxy resin coating on the market.

- ★ PITT CHEM "Tarset"® Coal Tar-Epoxy Resin Coatings
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PITT CHEM Industrial Coatings are available through leading Industrial Distributors. See the "Yellow Pages."

No other coal tar-epoxy resin coating duplicates the exclusive TARSET formula. It has not been made available to any other coating manufacturer.

Do you have a stubborn corrosion problem in the marine, chemical, petroleum, pulp and paper, water and sewage or plant maintenance field? Then you should know *more* about the amazing ability of cold-applied TARSET to stop corrosion where most other practical methods fail.



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highlights

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CORROSION CONTROL — 6th Annual Feature

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**CHEMICAL
PROCESSING**

JULY 1959

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THIS MONTH'S COVER

Our cover this month portrays the Corrosion Control feature in this issue and also an Exclusive CP Report on the St. Lawrence Seaway.

Mr. Guy Williams, NACE Director and Dowell Corrosion Specialist, is shown examining a section of corroded tubing. His article, leading off the Corrosion Control Spotlight, starts on page 71.

The ship shown is the Grace Lines ship, Santa Regina, which was one of the first vessels through the Seaway. For CP Report on impact of the Seaway, see page 26.



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SPECIAL READER SERVICES

• For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page

• To subscribe to this magazine see reader-qualification form opposite last page



Chaldron Ell Slug rides again!

"... and with a hearty 'Hi-Ho,' our reckless rider of the Variable Constant range swings out of the saddle again to whip up at the old chuck wagon a new 'stew' featuring falderal as the main ingredient.

In a note appended to his most recent letter, Chaldron Ell Slug writes, "The pot really seems to be boiling with the three splendid letters in the May issue, and I just couldn't resist replying to Mr. Shaw's letter (page 9) with a new angle."

So, as we said earlier, "What the ell," here we go again.

Dear Sir:

It gives me great pleasure to note the degree to which the Variable Constant System has been accepted.

I am also profoundly conscious of the fact that our many contributors (Fischer and Guare—Feb.); (Davis—April), and (Shaw, Carley, and Wray—May) have demonstrated the chivalrous and gentlemanly nature of we engineers in the chemical processing industry.

I observe with some distress, however, that even Mr. Shaw, who avers that I "discussed only an elementary approach" to variable constants, is himself only building upon my hypothesis without delving into the fundamental rules which prove the validity of the V. C. S.

In order to spare your readers the inconvenience of deriving the fundamental principles, I append below a listing of a few of the more basic concepts on which the Variable Constant System is founded:

Graham's Law: The number of crackers eaten during any coffee break is inversely proportional to the square root of the density of the coffee.

Maxwell's Rule: Every person on a production shift is acted upon by a force tending to move him in such a direction as to enclose the maximum amount of coffee per unit time.

Hooke's Law: If it can fit into a briefcase, it will be missing from the lab within a week.

Lissajous Figures: The appearance on TV screens of pretty figures showing a variety of

Two ways of providing EXPOSURE PROTECTION



TOO LATE ▲

to prevent serious heat exposure, a valiant attempt is made by firefighters to prevent rupture of tankage, not already involved in flames, with relatively ineffective hose streams.

GRINNELL WATER SPRAY SYSTEM ▶

shown under test at the Marietta, Ohio plant of the Bakelite Union Carbide Plastic Company, a division of the Union Carbide Corporation. Water — when it is applied in time and distributed over the surfaces efficiently by a properly engineered system — is most effective in limiting tank fires and controlling their spread.



Proper safeguards are uppermost in importance in protecting tanks which contain gases and flammable liquids in the event of fire. For example, tanks must be guarded against extreme heat exposure. Leaking gas, if it should develop, must be diluted to the point where it will not burn. And fire, if it should occur, must be localized and controlled or extinguished.

With a Grinnell Water Spray System, you get protection against all these eventualities.

Before heat raises tank temperatures dangerously, an enveloping spray of water provides instant cool-

ing, reducing internal pressure which helps prevent rupture. In addition, air turbulence is created (even in still air) which, in conjunction with the water vapor from the spray, helps dilute the flammable vapors controlling or extinguishing the fire. Flammable products which cannot be safely extinguished can be burned off under the protecting water spray with no damage to adjacent protected equipment.

There is a Grinnell Fire Protection System for every fire hazard. Call on Grinnell for advice about the one suited to your needs. Grinnell Company, Inc., 277 West Exchange Street, Providence 1, R. I.

GRINNELL FIRE PROTECTION SYSTEMS SINCE 1870



Check 2631 opposite last page

characteristic curves.

Moment of Inertia: The time between 8:30 a.m. and 5 p.m.

Reluctance: The time of day prior to 8:30 a.m.

Doppler Effect: Difference between velocity of shift appearing for work, and velocity of shift leaving for home.

Pinch Effect: Expected result when you sneak up behind the office typist.

Seebeck Effect: Knowing intuitively that the boss is about to open his door to see if you are working. Corollary to the Seebeck Effect—the act of working during such intervals.

Replacement Series: The arrangement of employees in order of their efficiency in conforming to the Seebeck Effect.

Twaddell Scale: The percentage of necessary discussion in proportion to the total volume of conversation. Also measured as "small Torque" or "big Torque" depending upon who is doing it.

Coefficient of Restitution: The chances of getting your dime back even though the machine is out of cokes.

Pascal's Law: Pressure exerted at any point upon a confirmed goldbricker is dissipated undiminished in all directions.

Newton's First Law of Motion: Everybody continues in his state of rest except insofar as he may be compelled to change by the action of some outside force.

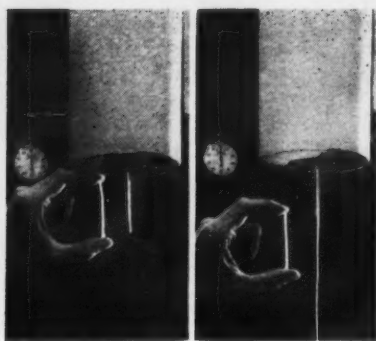
With this help, I now expect your readers to grasp the basics, and be well on the road to deriving their own equations in conformity with the requirements of their temporary employment.

CHALDRON ELL SLUG



"The coffee break has been over for 15 minutes!"

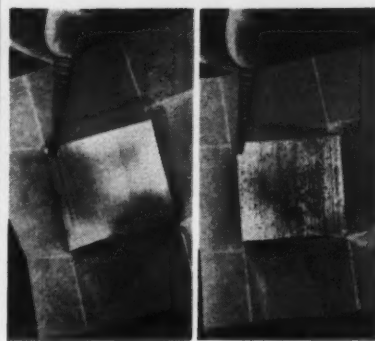
Monsanto Task Force Chemicals...



Santonox and Santonox R

ANTIOXIDANTS PROTECT POLYOLEFINS FROM HEAT DEGRADATION

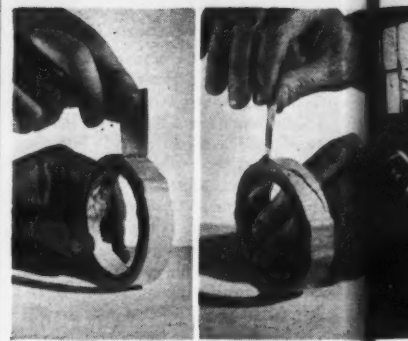
In Melt Index Test (above), samples milled 5 minutes and 30 minutes show how SANTONOX stabilizes polyethylene for more consistent performance. SANTONOX antioxidants stabilize low-, medium- and high-density polyethylene against degradation by processing heat and during product aging. They guard electrical compounds, film, molded products, cable covering, and extruded pipe made of rubber, polyethylene, polyisobutylene and other olefins. Most basic producers of polyethylene now add 0.02–0.05% to their finished compounds. Polyethylene users frequently mill in an additional 0.05% to give even more heat and aging protection to their finished products. In addition to SANTONOX and SANTONOX R, other Monsanto antioxidants show great promise for stabilizing a variety of polyolefin resins. To evaluate them, write Monsanto your requirements and the type of resin.



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Makers of water-base paints and aqueous aerosols incorporate a few tenths percent of sodium benzoate to inhibit rusting of the containers. Toolmakers go a step further: some dip their steel products in a 5% solution of sodium benzoate, thus putting a noncorroding anodic layer on the metal surface. Others wrap small tools in paper containing sodium benzoate. Either the simple dip or the paper wrap keeps the metal free of rusting. Many plants that operate calendars or large metal rolls mop a 5% solution of sodium benzoate over the equipment when shutting down; this keeps steel rolls, packaging machinery, or conveyor rolls free of corrosion during down time. And when cutting oils can't be used in machining materials like rigid plastics or hard rubber, sodium benzoate solutions frequently do the job, and with no rusting of valuable power equipment.



Santovar A

INHIBITS OXIDATION OF UNCURED POLYMER FILMS, UNSATURATED RESINS AND OILS

It is a good, practical stabilizer for oxidizable materials subject to too fast aging, and for quick-to-discolor and-stiffen (or turn sticky) polymers such as uncured natural and synthetic rubbers. For example, it keeps uncured nitrile latex binders soft and flexible in carpet backing and nonwoven fabrics. It works equally well on unsaturated resins and oils. Nonstaining and non-discoloring, at little as 0.5–4.0% SANTOVAR forestalls premature aging of adhesives and even thin-spread permanent-tack backings such as coatings for tapes, labels, and signs. It also reduces the cold flow of uncured compositions by imparting a stiffening effect, a valuable processing aid in coating applications.

Mission today:

LONGER P

MONSANTO CAN PUT A WHOLE TASK FORCE OF CHEMICAL "AGE IMPROVERS" AT YOUR COMMAND

Today, Monsanto antioxidants, stabilizers, inhibitors, preservatives and protectants give enduring youth to hundreds of products in dozens of industries. You may find the chemical "workings" of those materials shown here will help solve your problems of product aging—put your product years ahead

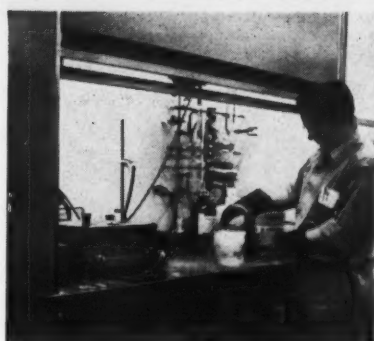
of others. Chances are, Monsanto has a highly satisfactory "age improver" for your product now. It's easier than a literature search to find out. Just jot down your specific problem and send it to: Monsanto Chemical Company, Task Force Chemicals, "Age Improvers A-2," St. Louis 66, Missouri.



Aroclor 5460

STRENGTHENS THE KILL-LIFE OF VOLATILE AND "WASH-AWAY" INSECTICIDES

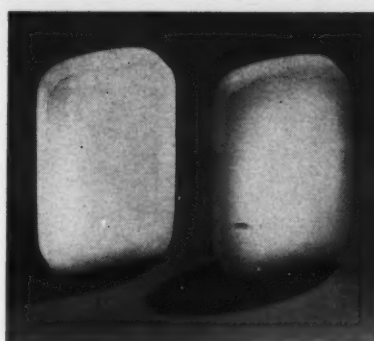
Imparts staying power to a variety of pesticides including DDT, Dieldrin, Malathion, chlordane, DDT, and lindane. Example: under research conditions a sprayed-on solution of 25% lindane, 25% AROCLOR, and 50% solvent enabled the treated surface to kill houseflies for 60 days... ten times longer than the same dosage without AROCLOR! In cockroaches, a lindane-AROCLOR mixture used at the rate of 50 mg. per square foot, under exacting experimental conditions, still registered an 80% kill after 60 days. The straight lindane solution, same rate, same conditions, scored only a 4% kill. Soluble in a variety of solvents, low-cost AROCLOR 5460 is easy to handle and formulate. It is relatively nonvolatile, nonflammable, nonoxidizable, and shows no primary skin irritancy or sensitization. For particular uses, such as insect traps or tapes, other AROCLOR bonding resins might be used.



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MAKES POLYESTERS AGE SLOWER—RESIST CHEMICAL ATTACK LONGER

It reacts with phthalic anhydride and propylene glycol to give finished polyesters as chemically resistant as much higher cost epoxies! HBP-A polyester resin/fiber glass laminates retain their strength in boiling 10% caustic, an extreme condition that dissolves ordinary polyesters away from the glass reinforcement. For binder resin applications, HBP-A can be formulated to make solid, uncross-linked resins with very high softening points. Substitution of HBP-A in no way affects normal cooking procedures; processing time is not increased; the finished resins possess higher heat distortion temperatures and better light and heat stability. Try the new formulation with HBP-A when you are cooking polyester resins for use in reinforced plastic pipe, storage tanks, fume hoods, duct work or other products exposed to corrosive atmospheres.



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In medium- and high-titer soaps, 0.04-0.05% SOPANOX based on the total soap weight prevents rancidity and discoloration in sunlight. Even low-titer soaps are protected, although unstable triglycerides may require 0.10% SOPANOX. It protects spray dried beads, chips, cakes, flakes, powders or liquid soaps without imparting odor or color. Most interesting—SOPANOX could impart the same protection wherever products containing fatty acids or metallic soaps are subject to rancidity or darkening. For example, synthetic rubber and latex made by emulsion polymerization with tallow soap might be more non-discoloring if SOPANOX were in the recipe. Write on your company letterhead for a trial sample.

Scrambled scruples

Dear Editor:

We are very happy to note J. D. Wray's correction of an error in our earlier letter (February CP, page 7) and for this you may read, "How could we be so stupid?"

However, his correction isn't quite correct either. The density of water at 3.98°C is 26,287 scruples/firkin.

The difference from Wray's value of 26,491 may arise from the fact that a scruple, of merely average quality, weighs 1.296 gm, not 1.286, as he states. We believe that the value of 26,287 should be employed (for this you may read, "Ah ha, we caught him, too").

Our method of checking this value is borne out by converting it to our density value expressed in scruple/kilderkin, which value we routinely use in our manufacture of brutyl alcohol, which product does induce lightheadedness in the still operators. (For this you may read "Hexamethyl chicken fat, indeed!")

WM. H. FISCHER
Chemical Engineering

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Analytical and Physical
Chemistry

Materials Engineering
Laboratory

General Electric Company
Schenectady 5, N. Y.

Group invention idea called unpractical

Dear Editor:

Schon's is a puzzling article (January CP, page 31). On one hand he states "... the most important argument against the individual inventor is that he is frequently unpredictable and undependable."

He concludes his article with the idea that the individual inventor can't sell his ideas to his "superiors"—the organization or management group. I don't see the logic of forming another identifiable group—of the chemist

PRODUCT LIFE



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Check 2632 opposite last page

LETTERS

and the "inertias" to "develop this family of ideas and generate new ones."

I wonder if Schon does not realize that imagination or inventive insight is a vary individual thing and that the "inertias" are not apt to "catch" it simply by association. Further, they would probably hamper the individual who does have it.

His saying that the likelihood of independent ideas being generated by an individual is small is absurd, I believe. Certainly ideas are not "generated" by six strong men and a mule.

An environment may be provided for the individual inventor. I doubt that such environment lies in "groupitis" or togetherness. Nor do I believe that forming a group of the people who resist inventive ideas will make them more susceptible of understanding—though the emperor's new clothes theory might have greater effect.

Group invention may be a "fashionable question" and Schon's "answer" may be equally in vogue, but I can't believe it's practical.

FLORENCE BUCKLEY
Waverly, Ohio

Senator Goldwater, our apologies

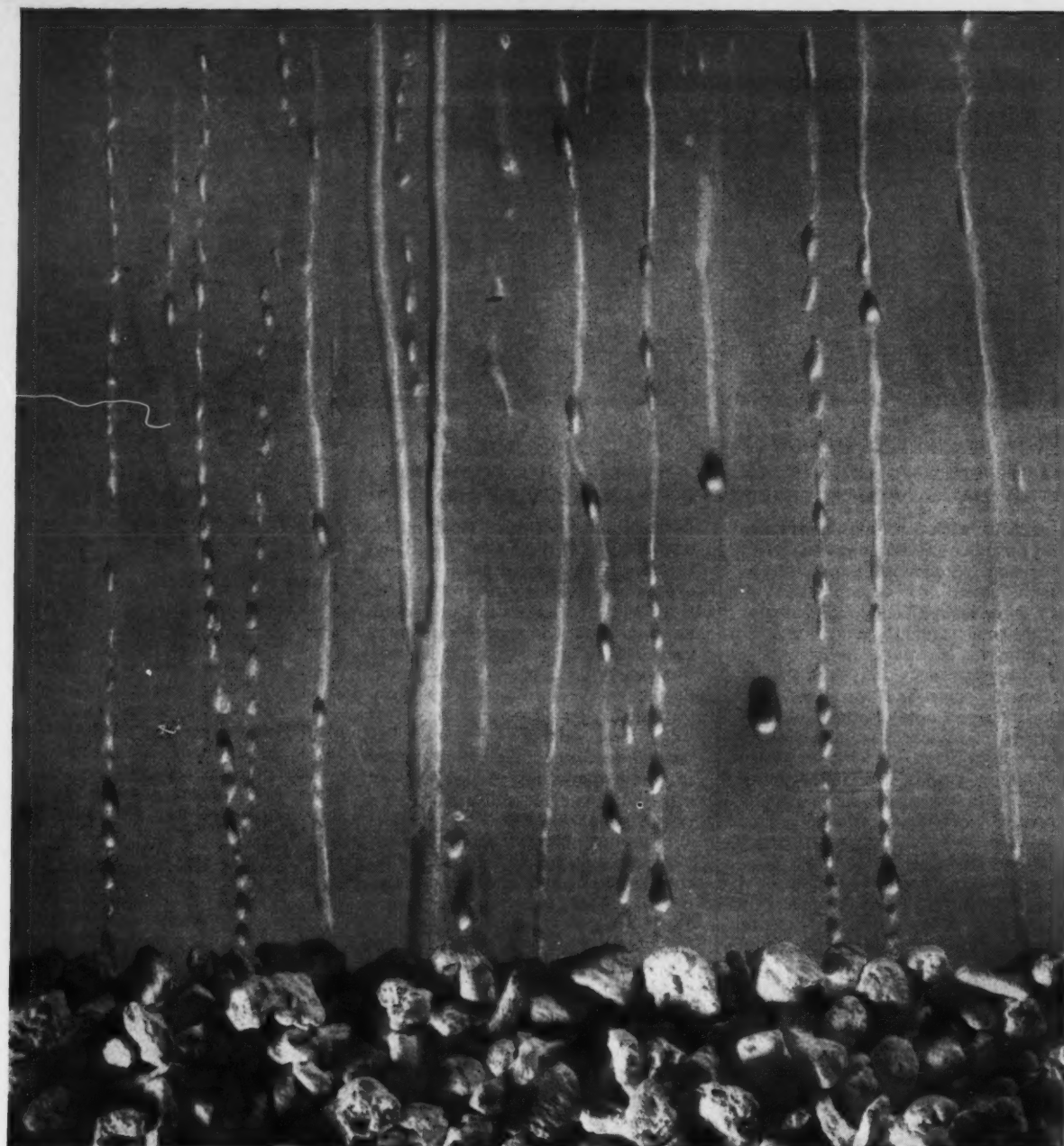
Dear Sir:

I would like to point out a discrepancy between the article printed in the April 1959 issue of *CHEMICAL PROCESSING* (p. 13) and my original copy.

In the last paragraph, third sentence, the word "compulsory" was left out of the printed article. It should have read, "My belief is that eventually compulsory unionism will be banned in every state . . ." As is obvious the entire meaning of the sentence is changed by leaving out the word "compulsory."

SENATOR BARRY GOLDWATER

(Editor's Note: *CHEMICAL PROCESSING* deeply regrets this error, and hopes it did not cause Senator Goldwater any inconvenience or embarrassment.)



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Water you can't remove is a sure bet to destroy the efficiency of a process or the quality of a product, or corrode the equipment. But you can count on drying up the last drop of unwanted water when you mix imagination and engineering with ALCOA® Activated Alumina. Here is the oldest, most thoroughly proved drying agent available. It makes possible dew points to minus 100°F and below. And because it can be saturated and reactivated almost endlessly without loss of capacity, it cuts drying costs substantially. See how quickly it can solve your dehydration problems. You'll join the thousands who've discovered it pays to mix imagination with Alcoa Aluminas . . . to make a new product or process possible, an old product or process better. To get product details, outline your desiccant application in a letter to ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 707-G Alcoa Building, Pittsburgh 19, Pennsylvania.

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Watching Washington

Scientific Apparatus 'Dumping' by Soviets Stirs Capitol Hill

Faced with Soviet "dumping" of scientific apparatus on the American market, manufacturers are telling their troubles to Congress — and listeners are sympathetic.

Concern of manufacturers is mounting, particularly as the new National Defense Education Act gets under way. The act authorizes federal grants of approximately \$70 million annually for four years toward purchasing scientific equipment for teaching purposes.

This must be matched dollar for dollar by state funds. (Actual yearly appropriation does not have to equal authorization. For the fiscal year ending June 30, 1960, some \$56 million has been allocated.)

With prospects of increased school business, American producers of scientific apparatus have taken a look at total educational sales figures for 1958 — about \$41 million — and predict a three- to four-fold expansion around the corner.

Soviet-made equipment was introduced to the American market early this year by the Ealing Corporation, Cambridge, Mass. Prices were from one-fifth to one-half those of domestic ones even after payment of more than 40 percent ad valorem tariff!

Receiving a cordial welcome in the Soviet Union, the importer returned home with a list of almost 100 items for placement on the American market. He exhibited 26 of the products before interested groups.

High Quality Rating

Equipment includes laboratoryware, electronic apparatus, projectors, and other school-room items. Those who have seen the equipment — both educators and manufacturers — give it a high quality rating, say it's well and imaginatively designed.

On Capitol Hill, problems of American apparatus manufacturers were discussed on the Senate floor. The Soviet action was branded "another step in the over-all Communist plan

to imbalance first one, then another segment of the U. S. business community."

Senator Bridges (R., N.H.), who described the situation in that manner, also pointed to the propaganda effect on American school children of using Soviet-made apparatus in laboratories. He suggested restricting federal fund use to non-Soviet and non-satellite countries.

Key senators are calling for investigations on a wide front. These would include such issues as dumping of aluminum, tin, lead, and other products.

Senator Keating (R., N. Y.) warned colleagues that before it's too late they had better face up to the problem of whether the U. S. will permit such items to be imported or whether the government should take action to bar them.

Senator Fulbright (D., Ark.), chairman of the powerful Foreign Relations Committee, called on various committees, including his own, to consider the matter as "part of what the Free World is to do in regard to . . . a raid by a state trading company."

'Price notification' bill up again

Senator O'Mahoney (D., Wyo.), who has introduced a raft of bills to regulate business, has come up with a not-so-new one again this session. The bill is S. 215, a "price notification" measure. Aimed at companies in so-called "concentrated industries," the



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bill would require them to notify the government of proposed price increases, then justify them at public hearings.

The proposed legislation affects those companies of \$10 million net worth or more in which 50 percent of sales are accounted for by eight or fewer companies. A report developed at the request of the Senate Antitrust and Monopoly Subcommittee in 1958 lists 636 products — many of them CPI items — in which 50 percent or more of the shipments are accounted for by the eight largest companies according to the 1954 Census of Manufacturers.

Smaller companies, too, would be affected. Operations would be delayed while hearings were pending for competitors, suppliers or customers. Delays could disrupt a smaller company, perhaps beyond repair.

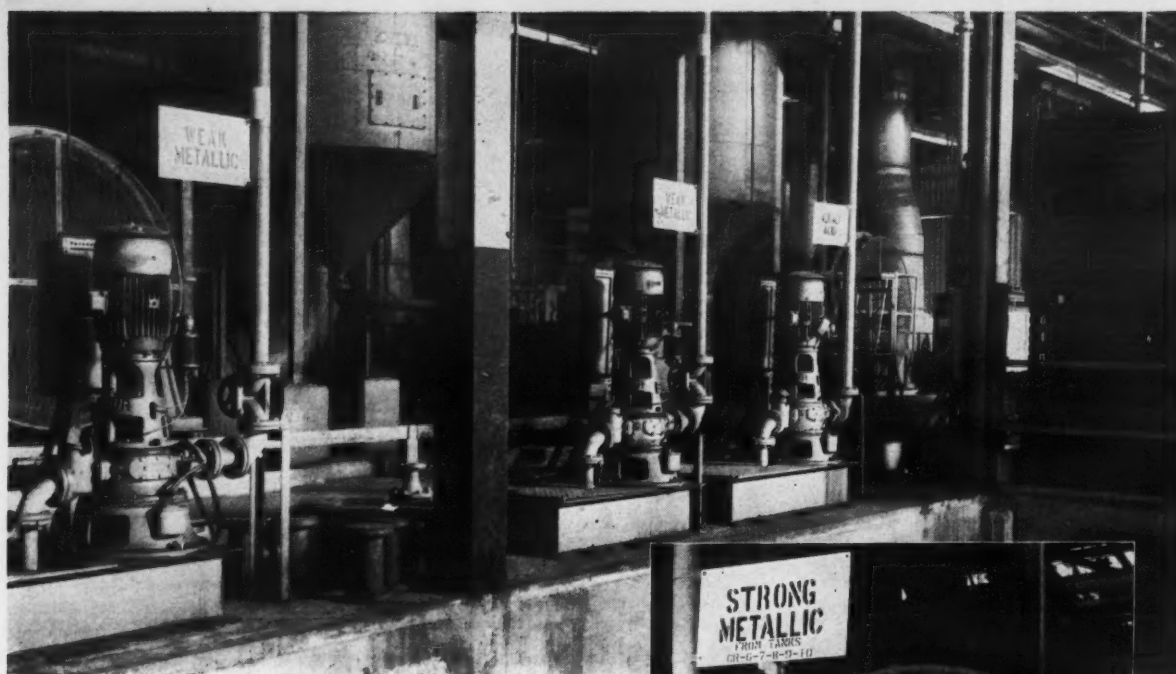
Objections were raised on nearly all fronts. General John E. Hull, USA (Ret.), Manufacturing Chemists' Association president, said in a letter to Senator Kefauver (D., Tenn.), subcommittee chairman:

"... Any substantial move, under current circumstances, to place direct, general government control over specific company or industry prices is incompatible with the institutions of a free economy.

Free of Regulation

"It is our view that at all times, with the possible exception of war or temporary periods of grave emergency, prices in the non-public utility sector of the economy should be subject to decreases and increases free of any governmental price-setting or price-inducing factors, except those implicit in our existing antitrust laws, tax measures, and the regulations of foreign trade and tariffs."

The chemical industry manufactures more than 8000 different products. In one of his few direct references to that industry, General Hull pointed out that, according to government statistics, prices of chemicals and allied products have



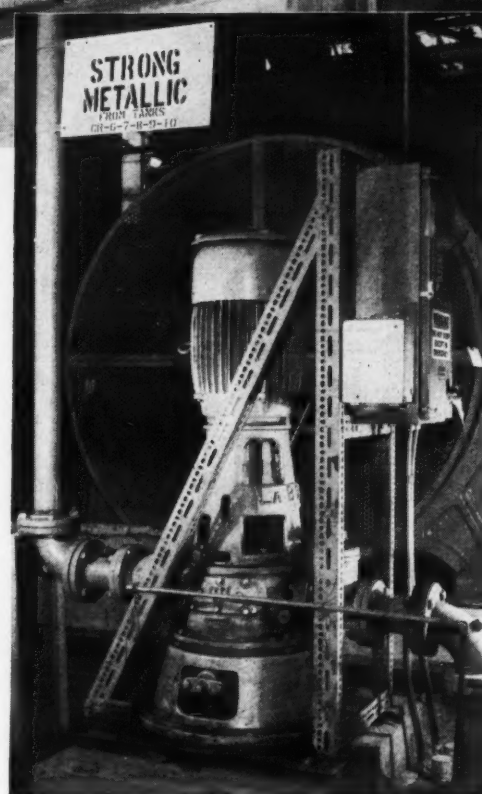
Daily Job:

Move a Million Gallons of Corrosive Liquids

Industrial waste treatment at this large automotive manufacturing plant calls for neutralizing 1,500 gallons of noxious solutions per minute. Some 150 LaBour pumps handle the cyanide, metallic acids, alkali and other corrosive liquids involved in cleaning and plating operations. Every day more than a million gallons of such liquids are pumped.

Highly satisfactory performance of the LaBour pumps is reported by the operating staff. The pumps are packingless, and maintenance is at a minimum.

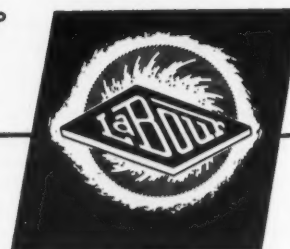
Your problems with corrosive liquids may be different, but you can depend on LaBour to solve them. Competent application advice is yours for the asking. Write us today.



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Check 2635 opposite last page

risen "far less" than have prices generally in recent years.

The National Association of Manufacturers called the bill a "long step toward government domination over the American economy." Competition would be discouraged, as well as technological advancement and business expansion, NAM said, adding that in many cases the bill would even discourage or prevent price reductions.

The immediate aim, NAM continued, "appears to be to shift the burden of responsibility for inflation from wage costs to price increases, and to achieve a long-standing desire of unions for a 'look at the books' of business firms."

The Justice Department vehemently opposes the bill, calling it "anti-competitive." While the measure is given little chance to pass, it does serve to add one more stroke to the picture portraying big business as the bad boy of our times.

Agricultural product regulation proposed

Some 4000 new agricultural products will be federally regulated if a proposed amendment to the Insecticide, Fungicide, and Rodenticide Act of 1947 becomes law.

Industry favors the bill—H. R. 6436—since its result would be uniform regulation of agricultural chemicals. One specific—the measure would eliminate possibility of conflicting controls under other federal legislation.

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Booming Economy Puts \$ Signs In Eyes of Chemical Investors

WILLIAM R. WHITE, Market Analyst

Hornblower & Weeks

Industrial recovery, gaining momentum every month, has exceeded optimistic forecasts. Corporate earnings reports have provided cheerful reading for stockholders. Because chemical products are used so widely in so many industries, it is not surprising that representative manufacturers in this group have prospered in the first half of 1959. Moreover, it is not surprising that chemical stocks have regained a high degree of popularity among investors.

Results have fulfilled the observation expressed in January in this column that "promise of more impressive earnings gains in 1959 helps explain revival of a confident investment attitude toward this once highly popular growth stock group."

Representative companies described in these brief bi-monthly observations have scored outstanding wide gains — stocks such as Allied Chemical, Dow Chemical, Du Pont, Eastman Kodak, Hercules Powder, and Union Carbide. Many others involved in nuclear weapons programs have performed even more spectacularly marketwise.

Further Progress Seen

Benefits derived from intensified chemical research offer such persuasive attraction for managements in the form of new consumer products and lower raw materials costs that continued progress can be envisioned in an economy of steadily mounting labor costs and high national income.

Chemical processors have many advantages in combating inflationary economic forces. Modern facilities are highly automated, contributing to a relatively low labor factor; depreciation rates generally are sufficiently liberal

to provide a generous "cash flow" and to permit generation of adequate funds with which to finance normal expansion.

Potential markets for new and improved products based on chemicals are enormous. As an example, it may be noted that chemicals capable of curbing or destroying weeds and plant pests are being introduced that could significantly reduce crop damage, which is estimated at almost \$3 billion annually.

Extent of the growth potentials for chemicals in the electronics industry is illustrated by the fact that some \$500 million of chemicals and chemical-process products were consumed by electronic manufacturers last year, a total representing more than half of all raw materials used by such companies.

Drug Growth Tremendous

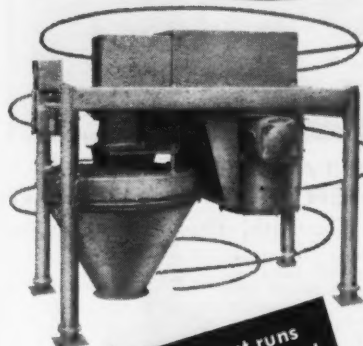
Probably no more dramatic example of progress in chemical research can be cited than the pharmaceutical industry, which has experienced a phenomenal expansion in ethical products. It has been said that seven out of 10 prescriptions written by physicians today could not have been filled a decade ago. Profits of corporations sharing in this impressive progress have registered above-average growth.

In addition to individual companies in the chemical group mentioned from time to time here, investment trusts and mutual funds affording representation in chemical or petroleum (petrochemical) companies have appeal for conservative investors.

(For further information on chemical stocks write Hornblower & Weeks, 40 Wall St., New York 5, N. Y.)

Check 2648 opposite last page.

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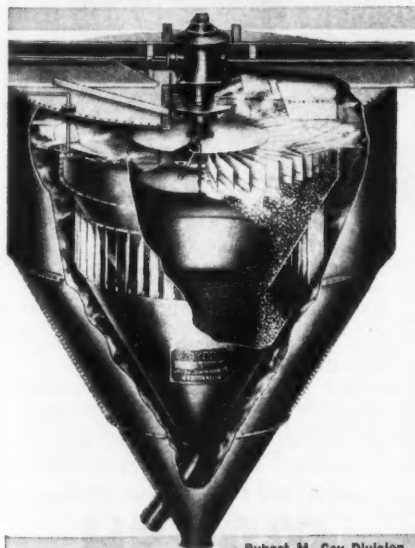
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Spotlight On People

DR. GLENN A. NESTY, vice president, research and development of Allied Chemical Corporation, is elected to board of directors. In Allied's Solvay Process Division, WILBUR H. BRUMFIELD is appointed executive vice president; RAYMOND LARGENT, vice president, and DR. HERBERT C. WOHLERS, director of research.

Callery Chemical Company announces election of DR. JERRY MCAFEE, vice president-engineering in the manufacturing department of Gulf Oil Corporation, and GEN. K. D. NICHOLS, consultant to Gulf on atomic energy, to Callery's board of directors.

WARREN F. BEASLEY is elected president and a director of Corbu Industrial, S. A., a subsidiary of Hercules Powder Company in Mexico City.

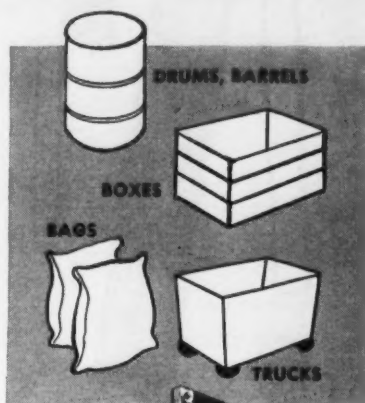
At Ketona Chemical Corporation, JACK D. HAYES, assistant general manager of Hercules Powder Company's Explosives Department, is elected vice president. At the same time, Hayes and ALTO J. SMITH were named to Ketona's board of directors.

DR. CHARLES C. WINDING is elected a director of Cowles Chemical Company. He is director of the school of chemical and metallurgical engineering and professor of industrial chemistry at Cornell University.

CHARLES C. HORNBOSEL is named corporate controller of Hooker Chemical Corporation. At Hooker Chemicals Limited, new directors and officers are: THOMAS E. MOFFITT, president; HORACE W. HOOKER and GEORGE E. GENTES, vice presidents; ANSLEY WILCOX II, secretary; EDWARD W. MATHIAS, treasurer, and GEORGE C. RICHARDS, assistant treasurer. Additional directors are R. WOLCOTT HOOKER, ROBERT E. WILKIN, FRANK W. DENNIS, and ROBERT A. C. DOUGLAS.

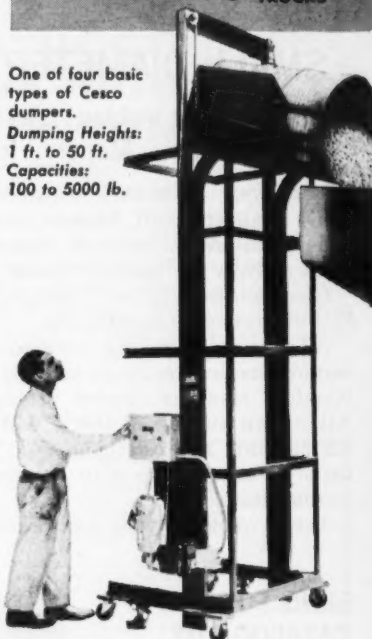
Collier Carbon and Chemical Corporation announces the following officers for 1959: W. L. STEWART JR., board chairman; ROBT. T. COLLIER, president; WM. C. KAESCHE, executive vice president; HOMER

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Dumping Heights:
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100 to 5000 lb.



• Just push a button, and your CESCO dumper lifts and dumps drums, barrels, bags, boxes, trucks — quickly and safely. You save manual labor, reduce hazards, boost productivity. Look around your plant now to see where CESCO dumpers can save for you. Special dumpers engineered to your requirements.

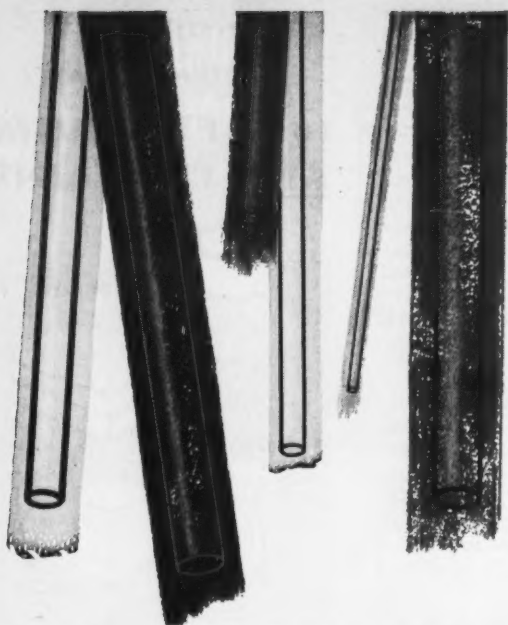
Send for helpful catalog A-7 describing complete line.



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PEOPLE

REED and ROBERT S. RAY, vice presidents; HOWARD W. WRIGHT, secretary; PAUL FOREMAN, treasurer and assistant secretary, and FRANK H. DLOUHY, comptroller.

PHILIP M. DINKINS is re-elected president and, in addition, chief executive officer of General Aniline & Film Corporation. JOHN HILLDRING is re-elected board chairman. Other officers re-elected are FRANCIS A. GIBBONS, executive vice president; LEOPOLD F. ECKLER, MATTHEW M. GOUGER, WALTER A. HENSEL, JESSE WERNER, and SUMNER H. WILLIAMS, vice presidents; ARTHUR J. YOUNG, controller; ALBERT E. HENDERSHOT, treasurer, and C. JOSEPH HYLAND, secretary.

MURRAY STEMPEL is elected president of Morningstar-Paisley, Inc. He succeeds GEORGE J. MULLER, named vice chairman of the board.

SYDNEY T. ELLIS is chosen president of Petro-Tex Chemical Corporation.

At Olin Mathieson Chemical Corporation, J. E. WILLIAMS is appointed corporate vice president for manufacturing services and a member of the president's staff. RICHARD M. FURLAUD, general counsel, is named a corporate vice president, and RICHARD BRYCE is chosen treasurer.

The Trubek Laboratories announces election of the following vice presidents to the board of directors: DR. DANIEL FRIEDLAND, HERBERT HALPERT, MORTON HARRIS, and HARRY H. HACHEN.

Announcement is made of the election of HERBERT E. HIRSCHLAND as vice president in charge of commercial development for Metal & Thermit Corporation.

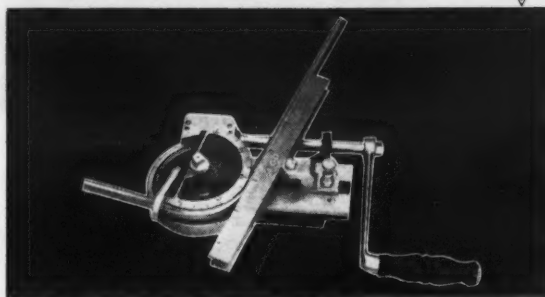
WILLIAM H. THORBECKE is elected vice president of Witco Chemical Company, Inc. in charge of the International Division.

Tennessee Products & Chemical Corporation announces election of DONALD F. BROOKLAND as vice president for alloys.

ALFRED E. RAWES JR. is elected treasurer of Thiokol Chemical Corporation.

IMPERIAL Engineering and Data Digest

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makes smooth, accurate, dimensional bends

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IMPERIAL NO. 400-F 37° Flaring Tool flares and burnishes stainless steel, steel and other tubing — $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", and $\frac{5}{8}$ " O.D.

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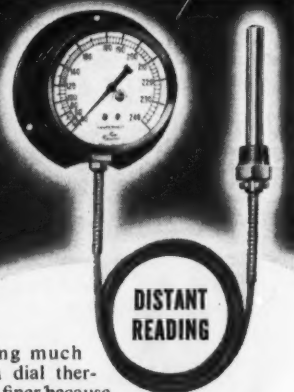
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Check 2643 opposite last page

CHEMICAL PROCESSING

Completion of Carwin Plant Broadens Isocyanate Supply

The Carwin Company announces commercial availability of ethyl isocyanate and phenyl isocyanate with completion of a new manufacturing facility at North Haven, Conn.

The unit doubles company's capacity to produce a variety of monoisocyanates, diisocyanates, and polyisocyanates.

Plant enables Carwin to further its plans for offering aliphatic diisocyanates and higher molecular weight aliphatic monoisocyanates in addition to present tonnage products, n-butyl- and n-propylisocyanate, toolidine diisocyanate, dianisidine diisocyanate, and polymethylene polyphenylisocyanate.

Du Pont announces completion is expected early next year of a second plant to manufacture "Mylar" polyester film. The facility, now under construction near Florence, S. C., will cost about \$20 million, and will nearly double the company's capacity for this industrial and packaging film.

The company disclosed at the same time it is building a \$6 million research laboratory for the Elastomer Chemicals Department at the experimental station at Wilmington, Del. Completion is expected by late summer next year. New facility will consolidate research activities of the department which have been conducted at two separate locations in the Wilmington area.

Texas Alkyls Inc. has under construction a \$1-million plant near Houston for the production of aluminum alkyls. Construction is expected to be completed in the fourth quarter this year. Rated capacity will exceed one million lb annually. Although initial production emphasis will be on aluminum alkyls, plant is so designed that a range of the alkyls can be manufactured.

Eastman Chemical Products, Inc. has revealed polyethylene production capacity at Texas Eastman Company's plant at Longview, Texas, has been increased from 85 million to 100 million lb annually. Recent additions to OXO facilities at Longview have brought ca-

capacity for aldehydes to 125 million lb annually.

Diamond Alkali Company is building a multi-million dollar research center near Painesville, Ohio. Brown Construction Company, Cleveland, expects to complete the facility in late 1960.

The company is expecting to complete this summer expansion of its Plastics Division technical service and applications laboratory, also near Painesville. The project will cost an estimated \$450,000, and will provide 5000 sq ft of additional laboratory space.

Kermac Nuclear Fuels Corporation now is producing sulfuric acid at its new 400-ton-per-day plant near Grants, N. M. The \$1.5 million facility, built by Western-Knapp Engineering Co., is an integral part of Kermac's uranium mill at Ambrosia Lake.

Morningstar-Paisley, Inc. is producing polyvinyl acetate emulsions at its recently completed plant at Clifton, N. J. The company announced its Chicago plant has increased output of these emulsions by 50 percent. As a result, total production of these materials has been doubled.

Air Products, Inc. has under construction at Glassmere, Pa., a \$6 million plant to produce and distribute high-purity liquid oxygen, nitrogen, and argon. Facility is scheduled to go on stream this fall.

The Chemstrand Corporation plans to build a new nylon development center on the site of its nylon plant near Pensacola, Fla. Major efforts will be concentrated on developing improved properties of nylon for special uses, new nylon fiber products, process innovations to produce new



Shown here are 33 of the 42 tank cars which will be lined in a single month by Lithcote. These cars, however, represent only a part of Lithcote's monthly protective coating application.

HERE'S HOW LITHCOTE CUTS THE HIGH COST OF CORROSION CONTROL

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Only durable, proved baked-on linings and coatings are applied by Lithcote Corporation—our own time-tested Lithcote line as well as the best of the many other recognized name brands. Furthermore, with our new oven equipment, sprayed Plastisol (PVC) materials may now be applied to *any piece of equipment which can be transported by truck or rail*. Plastisols provide for the resistance of sheet rubber *without seams*, in thicknesses up to 1/8".

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PROCESSING

STORAGE TANKS
TANK CARS
VACUUM TANKS
EDIBLE OIL TANKS
FATTY ACID TANKS
FILTER PRESSES
FRUIT JUICE CONTAINERS
LIQUID SUGAR TANKS

TRAYS
DRYING EQUIPMENT
CHEESE VATS
MILK STORAGE TANKS
WHEY TANKS
CARBONATED BEVERAGE EQUIPMENT
WATER TREATING EQUIPMENT

TRANSPORTATION

The many products transported in Lithcote lined tank cars and trucks include:

LATEX
FORMALDEHYDE
ACETALDEHYDE
INVERT SUGAR
EDIBLE OILS
VINEGAR
TALL OIL
CAUSTIC SODA
CARBON
BISULPHIDE
PLASTICIZERS
EMULSIONS
CARBON
TETRACHLORIDE

GLYCERINE
ALCOHOLS
WINES
CORN SYRUP
FATTY ACIDS
TRANSFORMER OIL
ACETIC ANHYDRIDE
SULPHURIC ACID
LARD
LACQUERS
PHENOL
TRIETHANOLAMINE

CHEMICAL AND PHARMACEUTICAL

STORAGE, MEASURING, FERMENTING AND MIXING TANKS
CAST IRON FILTER PRESS PLATES AND FRAMES
VACUUM DRYERS, INCLUDING DRYER PANS
EXHAUST FANS AND DUCT SYSTEMS
PIPE AND FITTINGS
CENTRIFUGES AND CENTRIFUGAL BASKETS
PUMP CASINGS AND OTHER PARTS
AGITATORS AND MIXING EQUIPMENT
TRUCK TANKS
RAILWAY TANK CARS
VALVES
TROUGH, HOPPERS AND CONVEYORS

PULP AND PAPER

WACO FILTER VATS
AND CYLINDERS
PERFORATED AND SLOTTED SCREEN PLATES
FOURDRINIER PARTS
INLET AND OUTLET BOXES

HEAD BOXES
SAVEALL and DECKER VATS
WHITE WATER BOXES
STOCK CANALS
STOCK VALVES
PUMP CASINGS
FEEDWATER TANKS
REGULATOR AND INDICATOR BOXES

PETROLEUM

The same Lithcote experience in corrosion control is available to the Petroleum Industry for the internal and external coating of pipe and other equipment.



ASK FOR YOUR LITHCOTE CATALOG



LITHCOTE CORPORATION

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Check 2644 opposite last page

types of nylon fibers, as well as fibers other than nylon, and special equipment associated with these developments.

Chas. Pfizer & Co., Inc. is enlarging its existing ascorbic acid production at Groton, Conn., with construction of a four-story plant. Facilities for manufacturing Vitamin A and medicinal chemicals are being expanded. Present refining installations used in making bulk chemicals are being enlarged.

To aid in developing new drugs produced by organic synthesis, the company is building a hydrogenation laboratory to be operated by the chemical pilot plant. It will be a service facility for the chemical research and development department.

W. J. Barney Corp., Groton and New York, is general contractor. Target date for completion is late 1960.

Dow Corning Corporation has completed licensing arrangements with Westinghouse Electric Corporation to produce and sell ultra-pure silicon. The action marks the first diversification from manufacture of silicones in company's 16-year history.

Koppers Company, Inc. expects to lease approximately 133,000 sq ft of space in the former Hudson Motor Car plant in Detroit to mass-produce a new type of "sandwich panel" for residential construction. Facility will be equipped initially to produce expandable polystyrene panels for 1500 homes annually. Startup is expected in the fourth quarter this year.

National Cylinder Gas Division of Chemetron Corporation now is producing liquid oxygen, nitrogen, and argon at its \$1.75 million plant at Los Angeles. Daily production is in excess of 35 tons.

Spencer Chemical Company announces the second "substantial" expansion of its polyethylene facilities at Orange, Texas, since the plant opened in 1955. Work on plant enlargement is expected to be completed next summer.

North Star Chemicals, Inc. has under construction at Pine

See why ALCOA ALUMINUM makes a good design habit

Requirement: Apply heat to piping when a product must be kept liquid during transfer

Key to Good Design: Use Alcoa UNITRACE, the aluminum pipe with integral steam tracing

The problem of applying heat to product piping can be solved efficiently and economically with ALCOA* Unitrace, the aluminum pipe with the integral steam passage.

In Unitrace, the steam and product passages are extruded as integral segments of a single piece of ALCOA 6063-T5 aluminum alloy. The outside diameter of the entire unit is round like conventional pipe, permitting fast, easy erection with standard type fittings.

With Unitrace, you get the advantages of low cost, easy bending and quick fabrication. Unitrace eliminates the labor and cost involved in installing external steam jackets or steam tracer tubes. Lightweight lengths of Unitrace can be joined by flanged connections, or by welding, as illustrated. Where valves and fittings are incorporated in the product line, the steam can be carried around the fittings by a jumper line.

ALCOA Unitrace has aluminum's natural corrosion resistance, making it well adapted for transferring molten sulfur, ammonium nitrate solutions, glacial acetic acid, fatty acids, naphthalene, phthalic anhydride, urea, wax, tar products, syrups, and numerous other products which must remain in liquid state during transfer.

*Registered Trademarks of Aluminum Company of America

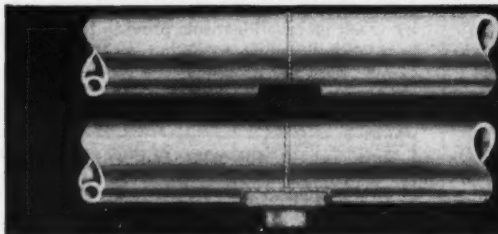
Unitrace is now available in standard pipe diameters from 1 in. through 8 in. Special cast Unitrace flanges, trace-caps, elbows and adapter flanges of ALCOA A356-T7 alloy make possible complete Unitrace piping systems.

ALCOA engineers have worked closely with all segments of the process industries for over 40 years and can help you specify the aluminum alloy tubular products and equipment best suited for your particular process applications. ALCOA's unparalleled experience in this field is available to you for the asking. Write to the address below, stating your requirements as specifically as possible. ALCOA's development engineers will welcome the opportunity to work with you on your problems.

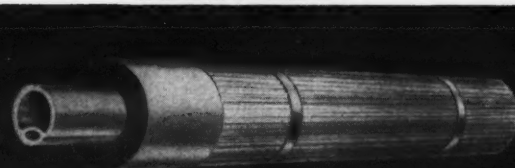
You also can take advantage of the wide selection of free ALCOA literature on aluminum for Unitrace and other process applications. Simply check the booklets you want on the coupon and mail to the address indicated. ALCOA will forward you the material promptly and without obligation.

During 1959, ALCOA will conduct engineering conferences in a number of major cities on process industries applications of aluminum. Contact your nearest ALCOA sales office for full particulars and dates.

UNFLANGED CONNECTIONS USING TRACE-CAP



THERMAL INSULATION



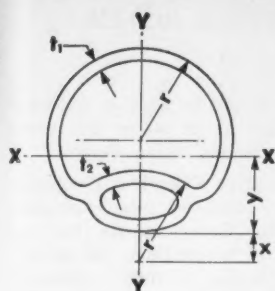
Where flanging is not required, sections of Unitrace can be joined easily and inexpensively by employing trace-cap. This is done by cutting back the trace line about an inch on the two sections of Unitrace to be joined. The product line then can be joined with a circumferential weld using 4043 weld wire. The trace-cap is then welded over the cut-away section to seal off the steam trace section of the Unitrace.

Alcoa Unitrace is designed to accommodate standard preformed pipe insulation. Boro-silicate glass wools or foams, or calcium silicate types are preferred. No protection of the aluminum surface is needed with these insulations. If cork, hair felt, asbestos cement or mineral wool is used, the aluminum surface should be coated with Aluminum Metal-and-Masonry Paint.

Temp. °F	Pressure psi	1 in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.
Up to 100°F	Bursting Pressure of Product Line	2980	2265	1925	1425	1210	1210	1085
	*Pressure Differential	2240	1700	1445	1070	910	910	815
	Bursting Pressure of Trace Line	2980	2265	1925	1425	1210	1210	1085
200°F	Bursting Pressure of Product Line	2800	2130	1810	1340	1140	1140	1020
	*Pressure Differential	2100	1600	1360	1005	855	855	765
	Bursting Pressure of Trace Line	2800	2130	1810	1340	1140	1140	1020
300°F	Bursting Pressure of Product Line	2530	1920	1630	1210	1030	1030	925
	*Pressure Differential	1860	1410	1200	900	755	755	675
	Bursting Pressure of Trace Line	2530	1920	1630	1210	1030	1030	925
400°F	Bursting Pressure of Product Line	1340	1020	865	650	545	545	490
	*Pressure Differential	670	510	435	320	275	275	245
	Bursting Pressure of Trace Line	1340	1020	865	650	545	545	490

*The pressure in the product line should not exceed the pressure in the trace by more than this amount.

Note: Bursting pressure data based on tests with welded Unitrace flanges and minimum mechanical properties.



Unitrace Sizes		1 in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.
Axis XX	Moment of Inertia (I) in. ⁴	.09	.34	.72	2.71	6.52	31.82	81.82
	Radius of Gyration (R) in.	.37	.58	.72	1.09	1.42	2.12	2.78
	Section Modulus (S) in. ³	.13	.34	.56	1.42	2.65	8.73	17.22
Axis YY	Moment of Inertia (I) in. ⁴	.09	.33	.70	2.65	6.36	29.72	76.70
	Radius of Gyration (R) in.	.37	.57	.71	1.08	1.40	2.05	2.69
	Section Modulus (S) in. ³	.14	.34	.59	1.52	2.83	8.97	17.79

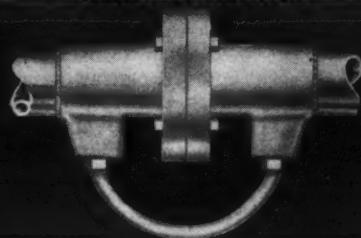
Sizes	1 in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.
r	.657	.950	1.187	1.750	2.250	3.312	4.312
t ₁	.133	.145	.154	.170	.187	.280	.322
t ₂	.145	.163	.174	.185	.200	.307	.354
x	.133	.344	.406	.625	.813	1.500	2.000
y	.61	.87	1.08	1.59	2.03	2.98	3.87

Unitrace Sizes	1 in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.
Product Area (in. ²)	.64	1.68	2.72	6.38	10.84	24.64	42.79
Trace Area (in. ²)	.10	.16	.35	.98	1.86	2.85	5.12
Metal Area (in. ²)	.65	1.03	1.39	2.28	3.24	7.05	10.60
Weight (lb/ft)	.77	1.22	1.66	2.71	3.85	8.38	12.60
*Min. Bend Radii (in.)	5	8	10½	17	24	36	48
Wetted Perimeter							
Product	3.35	4.92	6.31	9.68	12.72	18.63	24.75
Trace	1.49	1.71	2.40	4.13	5.32	6.75	9.63
Fitting Weights (lb)							
Trace-Caps	.102	.126	.240	.464	.674	1.67	2.92
Elbows	.706	1.347	2.111	5.244	9.649	27.76	52.51
Impingement Plates	.024	.039	.057	.101	.162	.22	.34
Flanges	1.186	1.919	2.851	5.515	7.762	12.93	18.62
1-2 in.		1½-2½ in.	2-3 in.	3-4 in.	4-6 in.	6-8 in.	
Adapter Flanges	2.419	3.816	4.774	7.216	11.106	19.23	

*Unitrace may be bent in any direction to these radii provided reasonable tooling is employed.

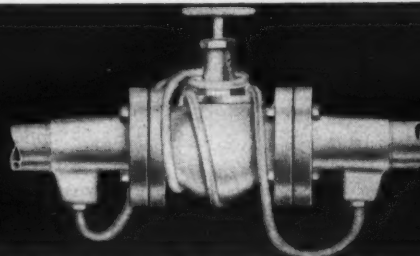
Average coefficient of thermal expansion (per °F)	-58 to +68°F	68 to 212°F	68 to 392°F	68 to 572°F
	12.1 x 10 ⁻⁶	13.0 x 10 ⁻⁶	13.6 x 10 ⁻⁶	14.2 x 10 ⁻⁶

FLANGED CONNECTIONS



Special cast Unitrace flanges are available in alloy A356-T7. Bolt holes mate with standard 150-lb ASA pipe flanges for easy joining to other piping and equipment. For joining, the Unitrace trace line is cut back a short distance. The Unitrace is inserted into the flange and welded at the front face and neck of the flange using 4043 weld wire. Adapter flanges are available for joining different sizes of Unitrace.

VALVES AND FITTINGS



Through use of Alcoa Unitrace flanges, valves and fittings can be incorporated into a Unitrace system. Tapped openings are provided in the steam chamber of Alcoa Unitrace flanges to facilitate attachment of jumper connections to traced valves and fittings. Alcoa offers Unitrace elbows with a 3x centerline radius. Several valve manufacturers offer steam-traced valves of aluminum.

Aluminum Company of America
872-G Alcoa Building, Pittsburgh 19, Pa.

Please send me the following literature on Alcoa Unitrace and other aluminum piping for the processing industry.

- ☐ 10186 Alcoa Aluminum Heat Exchanger Tubes
☐ 20437 Aluminum Alloy Heat Exchangers in the Process Industries
☐ 10460 Process Industries Applications of Alcoa Aluminum
☐ 10415 Welding Alcoa Aluminum
☐ 34-10418 Alcoa Unitrace: Combines Piping and Tracing in One Unit

Name _____

Company _____

Title _____

Address _____

City _____

State _____

Check 2645 opposite last page

Bend, Minn., a 240-ton-per-day sulfuric acid contact plant which will be the only H₂SO₄ facility in the state. Titlestad Corporation, New York City, is doing the engineering and will supervise initial operations. Quamco, Inc. is doing field construction work.

Shell Chemical Corporation is building a new phenol unit at Houston. The facility, scheduled for completion late this year, will produce acetone as a co-product. M. W. Kellogg has designed the unit and will construct it along with certain associated facilities.

Arizona Chemical Company plans to build a tall oil refinery in Springhill, La. The facility, slated to be in production next summer, will enable the company to process annually an additional 40,000 tons of crude tall oil.

Nopco Chemical Company has acquired in a cash transaction involving in excess of \$3 million all the capital stock of Jacques Wolf & Company, Clifton, N. J. Jacques Wolf will be operated as a wholly owned subsidiary. Its staff and sales force will be retained.

Allied Chemical Corporation has acquired Harmon Colors from The B. F. Goodrich Co. Harmon, a leading company in specialty organic pigments, will operate as a unit of Allied's National Aniline Division. Its general sales headquarters will remain in Haledon, N.J.

Meanwhile, Allied has announced it is proceeding with design of a new polyethylene plant to produce low and high molecular weight polymers. The unit will be located in an area where ethylene is available in substantial quantities. Allied also has disclosed that additional polyethylene capacity is being installed in the plant near Buffalo, N. Y.

Atlas Powder Company is moving its Thermo-flow plastic molding compounds manufacturing operations from Tunkhannock, Pa., to its Atlas Point plant near Wilmington, Del. As a result, the Tunkhannock plant was scheduled to be closed July 1. The consolidation is being effected

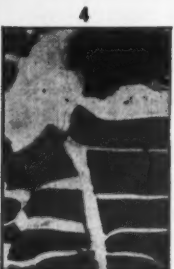


For exciting drama
watch "ALCOA THEATRE,"
alternate Mondays,
NBC-TV, and
"ALCOA PRESENTS,"
every Tuesday, ABC-TV

How RYKON GREASE

has performed in seven tough applications

In just two years since introduction, **RYKON** Grease has stepped in to deliver lubrication in hundreds of applications where other greases have failed



In the process industries where higher speeds, loads, temperatures and pressures are being put on bearings as a means of increasing productivity of equipment, a new

type of grease has been needed. RYKON is that grease. Here are just seven examples of how RYKON Grease has performed in tough spots:

Industry	Equipment	Type of Bearings	Conditions	Remarks
Packing Company	can closers	various	high temperature, heavy load, wet	Outperforms previously used greases.
Brewery	washers, conveyors	various	high temperature, wet	Lasts longer and does a far better job on all applications.
Packing Company	canning machines	plain and anti-friction	wet	Very satisfactory.
Chemical Laboratory	washers and degreasers	anti-friction	wet	Better than any grease tested in degreasing solvent.
Automotive Parts Mfr.	reciprocating pump bearings	plain	wet	Pumping chemicals. O.K. after one month. Previous grease caused about one bearing failure per week.
Paper Mfr.	liquid sulfur pump	anti-friction	high temperature, wet	Has extended life of bearings.
Paper Carton Mfr.	all grease-lubricated parts	various	high temperature, heavy load, wet	Replaced eight different greases. Stays in better.

The reason RYKON Grease can perform under conditions that cause other greases to fail is this: RYKON Grease has a unique non-soap, organic thickener. This thickener holds the oil between its fibers better than any other gelling agent. The thickener is able to withstand extremely high as well as low temperatures. It resists chemical action and remains stable under conditions of severe working and water washing. RYKON Grease has exceptional anti-rust properties.

RYKON Grease's unique properties make it truly multi-purpose. This leads to many

worthwhile economies. With one grease to do possibly every grease lubrication job in a plant, there's no chance for application mistakes. Inventory and handling of many single-purpose greases is reduced or eliminated and maintenance training and supervisory follow-up is greatly reduced.

More facts about RYKON Grease are yours for the asking. Call the lubrication specialist in your nearby Standard Oil office in any of the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.**



*You expect more from **STANDARD** and you get it!*

Oven test shows high temperature performance of RYKON Grease. 1. Metal panel coated with RYKON and placed in oven at 350° F. 2. Same panel after five days. RYKON is still soft and ready to lubricate. 3. Another high-melt grease ready for same test. 4. Same panel after oven test. Grease has failed completely.

Check 2646 opposite last page

CHEMICAL BUSINESS

concurrently with a \$250,000 expansion in Atlas' polyester program at Atlas Point.

Stauffer Chemical Company has completed new manufacturing arrangements to enable it to continue as an active factor in tartar chemical production. Tartar products will be produced to its specifications in Europe. Output of firms with which Stauffer has contracted will include all grades of tartar chemicals previously made in Stauffer's Brooklyn plant.

Polymer Industries, Inc. expects to complete by late fall a \$500,000 plant expansion which will double research and development facilities at Springdale, Conn. DeLuca Construction Company, Stamford, Conn., is general contractor.

Foreign Plants

Union Carbide Corporation plans to double polyethylene production capacity in the United Kingdom. Existing facilities at Grangemouth, Scotland, will be augmented by another 30 million-lb-per-year production unit, expected to be in operation next year. The Grangemouth facilities are operated by Union Carbide Limited, an affiliate.

Du Pont Company (United Kingdom) Limited has opened a new laboratory at Hemel Hempstead, 25 miles northwest of London. It is devoted to development work on neoprene and other synthetic rubbers and rubber chemicals for the European rubber industry.

Dow Agrochemicals, Limited is building a factory in King's Lynn, Norfolk, England, to manufacture "Dowpon" — a selective grass killer — under license from The Dow Chemical Company. Initial investment will be about \$2 million.

Montecatini Soc. Gen., Milan, Italy, disclosed commercial production of polypropylene textile fibers will begin in Italy at the end of this year. The new isotactic polypropylene textile fiber is obtained from low-cost propylene gas.

GAYLORD TECHNOLOGY

DIGS UP NEW PACKAGING IDEAS FOR YOU

Whether prospecting for new packaging ideas or simplifying existing containers, you strike pay dirt when Gaylord works with you. Gaylord sifts your packaging operation... then applies the experience of its many integrated services in recommending the right packaging for your need.

Your G-man knows how to make your packaging pan out. Call him... for corrugated boxes by the million or engineered packaging.



GAYLORD

CONTAINER CORPORATION



HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

For more information on product at right, specify 2647 see information request blank opposite last page.



DIVISION OF **Crown Zellerbach Corporation**



ECO

ENGINEERING

NEWS

the big name in small pumps for the process industries

From the Engineer's Notebook

Watch for a new and revolutionary Eco valve which utilizes atmospheric pressure to activate and dispense exact small amounts of highly viscous, heat-sensitive fluids—glycerine, biologicals and other pharmaceuticals, etc. Handles them at room temperature without contamination or frictional heat which might cause discoloration or affect purity.

Lever operated, it meters volume dispensed with accuracy greater than ± 1 per cent. Now being secretly tested by key plants. Public announcement soon.

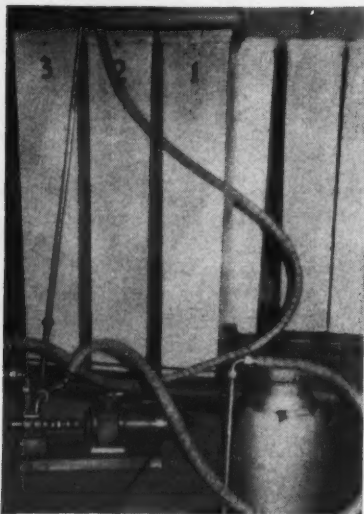
Coffee Break

Coffee is not a chemical per se, but chemists drink coffee—and like its sensitive flavor, uncontaminated.

Folger's Coffee, Houston, Tex. had problems in pumping concentrated coffee extract. Number 1—prevent contamination of product flavor and quality. Number 2—overcome pressure differential in pumping through filter to maintain same filtration rate throughout run. Number 3—lift extract out of tank without need for pump priming.

Eco ALL-CHEM* stainless steel and TEFLON† pumps are answering all requirements at lowest cost.

Eco pumps of this same design were originally proved for such service at the U. S. Dept. of Agriculture, Eastern Research Laboratories, Wyndmoor, Pa., which undoubtedly suggested their use to many coffee processors throughout the industry.



Eco ALL-CHEM Pump with Graham Vari-speed Transmission at Folger Coffee.

Paper Mills Pick Eco Pumps for Chlorine Dioxide Bleach

3000 hours without a rest—24 hours a day. Tough pumping job, but typical, at West Virginia Pulp and Paper Company's Luke, Maryland Plant, where three Hastelloy* C GEARCHEM* pumps equipped with TEFLON Gears, bearings and packing have been in operation pumping chlorine dioxide bleach and water at about 120° F and 60 psi.

Equivalent to nearly a year and a half of service at the usual 40 hour per week level, these pumps have used only two repair kits to keep them in continuous operation.

These pumps are used in constant flow metering of relatively small quantities (1 to 5 gal. per min.) to maintain bleach at predetermined strength and hence to control uniform color of kraft papers.

An added advantage from their use is found in the fact that these pumps eliminate air entrainment and hence minimize corrosion, protecting allied piping and equipment.

Successful operation at Luke has prompted a reorder of this same design for the company's other Plants.

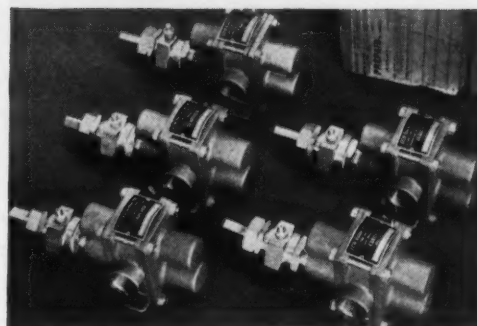
High Strength Phenolic Gears Withstand Vapor-Lock Shock-Loads at U.S. Rubber's Naugatuck Chem. Div.

The Pumping Service: handling butadiene and styrene monomers with 100 psi discharge pressures.

The Problem: the system created vapor-locks and shock-loads which shattered pump mechanisms.

The Solution: Eco Hastelloy C GEARCHEM Pumps with Phenolic Gears. These gears, which are non-affected by petroleum derivatives, are operating in a temperature range from ambient to 120° F. They are maintaining pressures and absorb back pressure shocks without suffering mechanically in any way, whatsoever.

QED: Eco's mass-produced, standard stock pumps may be engineered to the requirements of each individual job simply by varying the selection of the precision-made, interchangeable parts, available in the widest variety of metals and non-metals.



Five More Eco Pumps for Selective Ore Preparation

A leading Chicago metallurgical corporation (name withheld by request), has been using several Eco GEARCHEM Pumps for a particularly difficult pumping job—70 per cent Hydrofluoric Acid and Methyl Isobutyl Ketone plus Sulphuric Acid—in chemical extraction refining of rare metal concentrates.

These pumps are pH controlled to maintain desired range of concentrations in continuous make-up.

The pumps—400 Series, 10 gpm GEARCHEM design—are constructed of Hastelloy C with TEFLON Gears, Bearings and packings and grease sealed lantern ring stuffing boxes. Suction lift required for the highly fugitive solvent is 9 feet; for the acid 18 feet. Required discharge pressure is 50 psi.

This application has been so successful that the customer has reordered five more identical Eco pumps for a new installation in their Oklahoma plant.

Editor's Note:

This page is page 1 of a regular publication, issued by Eco Engineering Company, reporting "What's New" in small pumps and allied equipment, and their successful application in industry. If you are not on our mailing list to receive this Eco publication, write on your company letterhead. We will be glad to "welcome you aboard."

ECO Products for Handling Corrosive and Hazardous Processing Fluids

ALL-CHEM Rotary Pumps
MINILAB Rotary Pumps
GEARCHEM Gear Pumps

CENTRI-CHEM Centrifugal Pumps
PUMPMOBILE Portable Pumping Units
CHEMICAL FAUCETS Factory Mutual Approved

Ask for literature on any or all of these ECO Products

*ECO Trademarks. †du Pont Trademark. *Union Carbide Trademark.

For more information on product at left, circle 2649 see information request blank opposite last page.

ECO ENGINEERING COMPANY • 12 New York Avenue • NEWARK 1, N.J.

Strong efforts are being made to expand the use of radioisotopes and to provide a larger market for them. Little, however, is being done to make it easier for the user to dispose of the wastes.

Considering this striking imbalance . . .

Are Our A-Waste Disposal Regulations Too Tough?



SAMUEL S. AUCHINCLOSS, President
Tracerlab, Inc.

Samuel S. Auchincloss has a background of over 30 years of successful business experience. Prior to accepting his present post he was president of the Cleveland Welding Division of American Machine and Foundry Company. A graduate of MIT (class of '27), Mr. Auchincloss has held a number of other important executive positions in the electrical and electronic fields.

He served with distinction in the army from 1940 to 1946, attaining the rank of Colonel in the Signal Corps. He was chief signal officer, General Headquarters, Southwest Pacific, for General MacArthur.

THE problem of radioactive waste disposal has built up in 10 short years from one which affected a handful of professional people dealing with tracer quantities of isotopes to one which affects thousands of persons handling every conceivable quantity of radioactive waste material.

Our present methods of disposing radioactive wastes leave much to be desired. Cost of packaging and disposing of the waste is high. This creates a problem for the small user who has very little amounts of radioactive waste to get rid of. If it would be practical, a clear distinction should be made between the rules and regulations for disposal of radioactive wastes generated by small commercial firms and users as compared to wastes generated from reactor type operations. The costs of waste disposal in this competitive field is a significant factor in the cost for the ultimate user.

A dramatic example of what this can lead to is a recent case in which Tracerlab bid on a decontamination job which involved tearing out the inside layer of a building, woodwork, wiring, etc. The radioactive materials contained in the rubble would

then be packaged and disposed of by present accepted methods. In this case, 50% of the total cost went for disposal when actually the disposal cost could have been as little as 2%.

State Laws — More Woe?

As the users of radioisotopes increase, it is certain that state laws will be incorporated defining their own requirements in matters pertaining to the disposal of radioactive waste, thus adding more to the already heavy burden.

To cut the high packaging costs, regulations should be based on the amount involved, the type of material, and on the half-life of the activity. Strong efforts are being made to expand use of isotopes and to provide a larger market for them. However, there is no correspond-

ing attempt to make it easier for the potential user to dispose of waste — especially for the tracer quantities of isotopes.

This striking imbalance between the pressure to use isotopes on one hand, and the restrictions on their disposal in the other hand, is a major detriment to future expansion.

The nuclear industry in the U. S. has an outstanding safety record; one of the reasons for this record is that from the outset we have operated under stringent measures for producing, handling, and disposing radioactive materials. On the other hand, the safety records of England and Canada are also good, but they have been achieved without the excessively stringent disposal regulations of our country.

The English, for example, have used the oceans far more freely to dispose of relatively high-level wastes without requiring, in many instances, any form of container and without the requirement of a 1000 fathom depth at the point of dumping.

I certainly do not recommend promiscuous disposal of radioactive materials, but I do

To page 133

Next Month

What to do with the dangerous residual products accompanying nuclear energy is a problem still puzzling the experts. Risks connected with the various disposal techniques in use today will be discussed in the August issue.

CPI has demonstrated through fluctuations in the nation's economy that it can grow faster than all manufacturing activity, says this author. In analyzing volume, costs, and prices he provides answers to the question . . .

Can the CHEMICAL INDUSTRY Maintain Its Historic Profit Picture?

DONALD A. YOUNG, Vice President
Chemical Fund, Inc.

THE consensus of security analysts' opinions today is that the chemical industry is about to resume its historic rate of growth. As investors expect leading chemical companies to grow the securities of these companies are priced high in relation to current earnings and dividends. These observations indicate the generally accepted historic profit picture of the chemical industry is one of dynamic expansion, albeit one which needs to be resumed.

Resumption of profit growth is needed to justify confidence investors have placed in the industry and to create capital resources necessary for physical expansion. To evaluate the likelihood of future profits, we will examine the principal elements of the profit picture — volume, costs, and prices. The conclusion we derive is that profit margins are likely to increase over the next few years to levels above 1958 experience, but below earlier record levels. Aggregate profits of many chemical companies reached new high quarterly levels this year. Continuation of current conditions should result in record earnings in 1959.

The recent record of the industry is shown in Table I.

Continued research success leads us to anticipate that the 7½ percent per year growth rate of the industry will be fully maintained over the next several years. Recovery in the general economy should cause a somewhat larger near-term gain.

Chemical sales for 1959 are expected to be about 10 percent above 1958. Chemical production recovered to a new all-time high by October 1958, well in advance of all industry. Since then, production and sales have continued to advance, and currently are running more than 10 percent ahead of early 1958 levels.

Longer-range growth projections by Arthur D. Little, Inc., consultants to Chemical Fund, Inc., substantiate the conclusion that there is adequate potential for further expansion. Some of these projections will be found in Table II on facing page.

Costs

The chemical industry is uniquely situated with respect to several important areas of cost. Its principal raw materials are low cost, abundant commodities such as petroleum, natural gas, coal, sulfur, salt, limestone, air, and water. In most cases, the end product is many times the value of raw materials and increases in the cost of these materials usually are not large determinants of overall manufactured costs.

Although labor cost is not as large a factor in chemical processing as it is in most industries, it is a significant item of cost, and increases in labor costs have proceeded more rapidly than gains in productivity. Even in 1958, hourly labor costs rose about 5 percent.

In all industry, 154 major

labor contracts involving many millions of workers are up for negotiation. These pressures make it virtually certain that hourly wage costs will rise in the chemical industry in 1959, and these increases may exceed real gains in productivity the industry will be able to accomplish.

Research costs and expenses for sales and promotional activities have been rising — a trend that will continue in 1959 in most areas.

The principal near-term improvement in unit costs in the chemical industry is expected to result from more efficient utilization of installed capacity. One of the distinctive characteristics of the industry is a high ratio of capital investment to sales. Depreciation, maintenance, and other overhead charges are correspondingly high. These charges are relatively insensitive to short-range fluctuations in sales and become less per unit of output

during a period of rising production.

Volume Trends

Sales of the chemical and allied products industries have shown a consistently above-average record of gains. Through war, peace, recession, and prosperity the industry repeatedly has demonstrated its ability to grow more rapidly than all manufacturing activity. In a recession, it has declined less than the average and has recovered to new high levels of activity well in advance of all industry.

Since the end of World War II, the chemical industry has expanded at a compound annual growth rate of about 7½ percent — a growth stimulated by creation of new products which serve new markets. War-born products such as synthetic rubber, magnesium, antibiotics, and polyethylene continue to grow. Post-war developments

Table I

Composite operating results of 26 chemical and allied product companies: (\$ Millions)

	Sales	Net Income Before Tax	%	Net Income
1952	\$5,965	\$1,259	21.1	\$486
1953	6,373	1,308	20.5	520
1954	6,182	1,153	18.7	593
1955	7,222	1,535	21.2	782
1956	7,729	1,488	19.3	769
1957	8,203	1,556	18.9	798
1958	7,842	1,286	16.4	689

THE AUTHOR



Donald A. Young is a vice president of Chemical Fund, Inc. an open-end investment trust with approximately \$230 million invested in securities of companies operating in the chemical and allied fields.

In 1952 he joined F. Eberstadt & Co., investment banking house which provides management services for the Fund. He has been engaged primarily in portfolio management activities since then.

Young was graduated from Massachusetts Institute of Technology in 1950. Prior to joining F. Eberstadt & Co. he was an engineer for Owens-Illinois Glass Co.

such as aerosols, titanium, tranquilizers, and new families of plastic materials entered early growth phases. Today there are fully as many products at all stages of early progress as there were in earlier years.

The rate at which new and improved products are being introduced is accelerating as the industry puts more emphasis on research. Research expenditures have increased steadily and materially. In 1958 it is estimated these expenditures rose to about \$550 million, or 2¼ percent of industry sales.

The recent quarterly trend in profit margins, before taxes of basic chemical companies compared with operating rates of the industry indicates the sensitivity of this relationship, and is shown in Table III.

This record also reflects the beneficial effect of the strenuous efforts to reduce operating costs undertaken by chemical processors last year. Operat-

ing economies were so effective that 24,000 fewer chemical production workers were needed to produce the record output in October 1958 than had been required during the preceding high production level.

These economies were not translated into materially higher earnings, however, until sales began to improve and the trend toward more effective utilization of capacity started.

The industry entered 1959 with operating costs under good control. Prospective additions to capacity are below estimates of sales increases. Accordingly, other influences being equal, profit margins comparable to, or higher than, those experienced in the final quarter of 1958 may be experienced in 1959.

Anticipatory Expansion

Observation of the sensitivity of profit margins to oper-

ating rates directs attention to one of the prime causes of the disappointing trend in chemical profit margins since 1955. About that time many chemical company managements authorized capital programs which would recognizably increase capacity to produce basic chemicals beyond near-term market requirements.

As a result, operations as a percent of capacity fell from an estimated 85 in 1955 to 84½ in 1956, 81 in 1957, and 73 in 1958. An operating rate of 80 percent is possible for 1959.

Anticipatory expansions were justified largely on the basis that the eventually attainable economies of large-scale operation were sufficiently attractive to warrant overexpansion. Thus, to an extent, the industry deliberately sacrificed near-term profits to gain the opportunity for better eventual profits.

We are currently entering the period which will test the wisdom of these judgments.

Prices

The expanding excess of capacity during 1955-1958 contributed to a disappointing trend in overall chemical prices. The price trend, in turn, has had an adverse influence on chemical profits. Since 1955, hourly wage rates have advanced 18 percent. In most industrial areas, these cost increases have been offset in large part by increased prices. The index of all commodity prices except farm

products and foods has advanced 9 percent. Chemical price indexes are up only 3 percent over the same period. Chemical process improvements have offset a portion, but not all, of this differential.

During 1958, the relative price trend continued. The chemical price index fell one half of one percent while all prices averaged one percent higher. Furthermore, the industry sells a high portion of its products under special long-term contracts, and it is our belief that discounting under these contracts was more severe than the index of posted chemical prices suggests. Also, price discounting in the form of freight absorption, increased customer service, and other values has increased without compensating adjustments in charges.

Leveling of demand in 1958 and completions of expansion programs created conditions under which it was difficult to pass on added costs to consumers. Recent higher levels of operations have tended to reduce, but not eliminate, these difficulties. Needed price increases on a number of chemical commodities have been deferred. If demand continues to improve, it is logical to expect moderately higher average realizations for a number of chemicals.

Some price advances became effective early in 1959, raising the chemical price index to about one percent higher than a year ago.

Aside from overcapacity,
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Table II

Sales Volume in Millions of Dollars

	1948	Est. 1958	Projected 1968
Plastics	\$ 450	\$1,500	\$ 2,700
Synthetic fibers	123	670	1,260
Pharmaceuticals	1,050	2,225	4,500
Insecticides and related products	41	148	217
Basic petrochemicals	2,800	4,600	14,900
Industrial gases	250	550	1,000

Table III

Basic Industrial Chemicals
Estimated Operating Profit Margin
Rate, % of Capacity % Before Taxes

Year 1957	81	17.4
Fourth Quarter 1957	78	15.6
First Quarter 1958	73	13.3
Second Quarter 1958	69	13.5
Third Quarter 1958	71	14.3
Fourth Quarter 1958	78	16.2

WHAT THE SEAWAY MEANS

PAUL HOFFMAN, News Editor

Water transportation of chemicals and chemical products is rolling forward on a mounting tide of spectacular increases.

In 1947, total chemical products moving on the nation's inland waterways totaled 2.82 million tons. By 1957, the total was 10.17 million tons—an increase of 260 percent!

This is the overall picture. Specifically, tonnage of industrial chemicals skyrocketed from 10,956 tons in 1947 to 3.2 million tons in 1957. Sulfur, in the same decade, for example, leaped from 885,853 tons to 2.7 million tons.

Now that the enlarged St. Lawrence Seaway is open, many in the chemical processing industry are taking a long, hard look at the practicability of shipping raw materials and finished products via water direct to world ports.

Thus, the Seaway surely must be considered if one is to believe estimates that inland waterways traffic will grow at an annual rate exceeding 4 percent in the next 10 years.

A large share of this overall traffic increase most assuredly will be in movement of chemicals by virtue of the fact their volume and variety are on the upsurge. And not to be overlooked are the cold facts that the chemical processing industry is seeking new sources of raw materials. These now can be moved at attractive rates from abroad direct to Great Lakes ports via the Seaway. Likewise, the waterways and the Seaway offer CPI opportunities for shipping finished products at rates lower than some other forms of transportation.

Seaway's Effect on CPI

The question of how soon and to what extent the Seaway will have an effect on

CPI is up for grabs. Here are views of officials of two Chicago-based chemical companies. One said:

"The effect . . . will be apparent in a year or two."

The other opined:

"Any change will be gradual, and will become noticeable only over the years."

The vice president of a chemical firm headquartered in Michigan had this comment:

"The Seaway will not have a significant influence on the growth trend of the chemical industry."

And a Canadian had this to say:

"We will probably not see any drastic changes occurring immediately."

While some industry leaders remain divided in their opinions of when and how much the Seaway will affect CPI, the first ripple in the pond of positive action came on May 12 when Goodrich-Gulf Chemicals, Inc. shipped nearly 750,000 lb of synthetic rubber to Northern Europe.

Produced at the company's Institute, W. Va., plant, the rubber was transported in a fleet of 21 trucks to Cleveland, where it was loaded aboard the freighter "Fredborg" of the Swedish-Chicago Line.

Said Troy Mounce, G-GC's traffic manager:

"We believe the new Seaway offers Cleveland and Ohio the opportunity of becoming one of the major commerce centers of the world. The fact that we are making this shipment through

Cleveland at the beginning of the navigation season should be testimony to our faith and belief in the above statement."

CP Study

But what do others not associated with the chemical processing industry feel about the future of the St. Lawrence Seaway? Is it to be viewed through tinted glasses to bring it into sharp focus, or will the ultimate picture reveal blasted hopes of supporters who waxed too enthusiastic over its potential?

That's what the editors of **CHEMICAL PROCESSING** sought to ascertain in a months-long survey. During the investigation, U. S. senators, Chambers of Commerce leaders, and port authority officials were asked to give us their views. Their replies suggest that the future of this new traffic artery indeed appears bright.

Those who were polled represent states or cities bordering on the Seaway or the Illinois Waterway which links the Great Lakes to the Mississippi River at Chicago.

Capsule comments by these leaders were written expressly for **CHEMICAL PROCESSING**. Analyzing their opinions seems to leave little doubt the Seaway is destined to reshape the economy and geography not only of America but possibly of the world as well.

Here, then, are how federal, city, and civic leaders answered CP's question, "What is the future of the St. Lawrence Seaway?"

• 'Future Takes on Additional Brilliance' . . .

Thomas H. Coulter

• 'There Is Still Much to Be Done' . . .

Senator William Proxmire



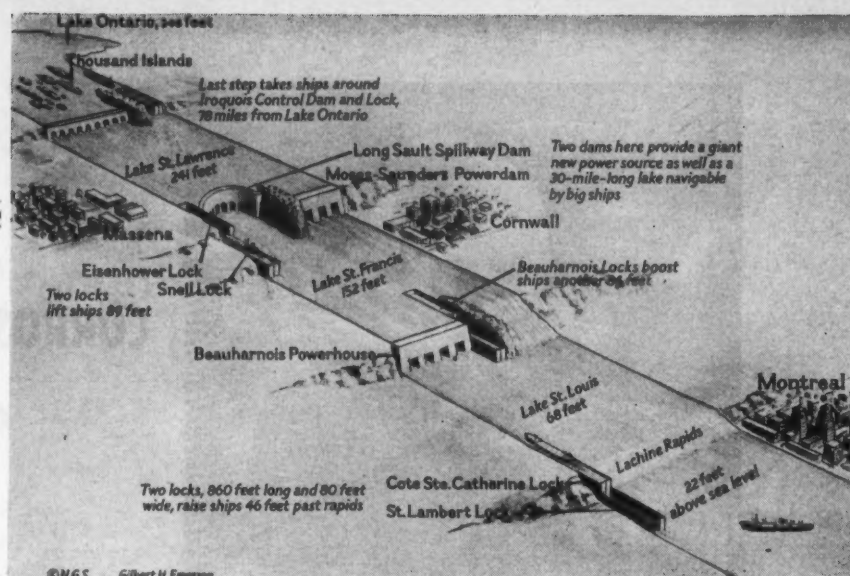
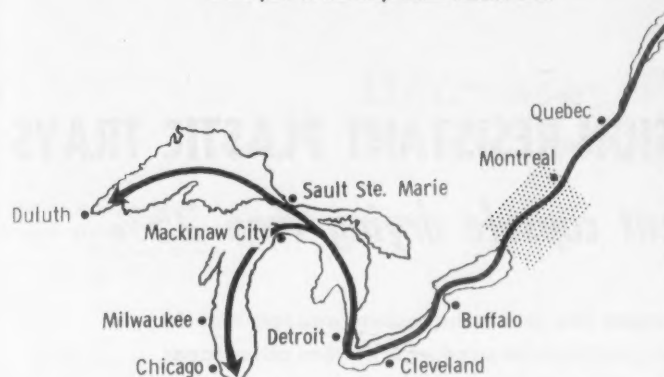
Senator KENNETH B. KEATING
(R., New York)

Completion of the Saint Lawrence Seaway can mark the beginning of a real "Golden Age" for all in the region of direct benefit from this significant event. That this important project can be finished at all demonstrates a kind of cooperation between and among existing international, federal, state, and local governments and industry which is in a sense a modern miracle rare in today's world of tension and distrust.

The Seaway will place Europe's great markets at its very doorstep. Only inertia and fear of change would prevent a spectacular growth and great prosperity. The future is not for little men with little minds, nor for men without vision. The future is for the men of daring, who have great expectations, who with guidance, perseverance, and leadership will strive to transform those great expectations into reality.

Tools themselves produce nothing. It is the man of

How vessels can go directly from the Atlantic Ocean to the Great Lakes via the newly enlarged St. Lawrence Seaway is shown on the map. The Seaway proper is depicted in the diagrammatic illustration of the locks—reprinted through courtesy of The National Geographic Magazine—and is the part of the map within shaded area



imagination who uses the tools who is the producer. So as the Seaway provides the tools, it is up to men of vision to create the future.



HARVEY CAMPBELL
Executive Vice President
Greater Detroit Board of Commerce

It is economics alone that will determine the future of the Seaway. There is only one fellow who is going to make or break the Seaway, namely, the traffic manager. He is the man who will tell his boss: "Let's use the Seaway because we'll save money; or time, which is money; or maintain closer control, which may mean money; or safety, which means the same thing."

Much of the whole Seaway story hinges on bulk cargoes, with overseas general cargo as the glamorous icing on the cake.

Future tonnages alone will not be the only criteria spelling success or failure of the Seaway as an improved al-

ternative transportation route. The enlarged Seaway will provide more competition in transportation. Access to seaboard ports, whether by rail or by truck, will be available at lower freight rates. Even a Midwestern shipper who may never make direct use of the Seaway itself will benefit from this new competitive factor.



Senator WILLIAM PROXMIRE
(D., Wisconsin)

Opening of the St. Lawrence Seaway will transform the high anticipation of the Great Lakes area into long-awaited reality. [But] there is still much to be done.

The federal government, for example, has still to complete improvements to the Great Lakes connecting channels before the promise of the Seaway can be a reality in the Upper Great Lakes states and provinces. Much remains to be done by the states and various port cities to realize the commercial development

which the Seaway can bring to them.

Important questions of public commercial policy remain to be established. The type of new policies that are evolved will determine the ultimate benefit that we will realize. There are still questions involving policies affecting port development and management, potential national or international projects such as hydroelectric plants, rate and priorities of federal dredging and harbor development work, and revisions in commercial regulatory measures.

W. J. ROGERS
Director of Port Control
City of Cleveland

With the creation of this fourth seacoast will come a beneficial economy which will create new industrial and commercial centers that will spread through every section of the Middle West states abutting the Great Lakes. Large trunk line railroads will play an important part in shipping to and from the different cities.

Representatives of foreign countries are preparing their sources in the various cities along the Lakes in order to take advantage of the new economy which will mean so much to them. All large banking interests in port cit-

ies are setting up departments which will be used exclusively for the accommodation of shippers.



W. J. ROGERS

We are certain that every type of general and bulk cargo will soon be unloading at all Great Lakes' port cities. We know that chemicals, petroleum, pharmaceuticals, rubber, paint, and varnish will, because of the savings brought about by shipping directly to and from the Great Lakes, add to the tonnage.

J. H. MOORE
General Manager
Hamilton (Ontario)
Chamber of Commerce

At the outset, a considerable number of our industries will suffer severe competition from European imports which can be landed on our docks at prices lower than the same products can be made here.

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At R. P. Scherer Corp., capsules are spread on plastic tray after they have left the capsulating machine. Next step is drying in conditioned air tunnels

CORROSION-RESISTANT PLASTIC TRAYS

cut capsule drying time 25%

Longer life, less maintenance, and fact that they do not contaminate product are other advantages found for reinforced polyester resin trays

EXPERIENCE of four chemical processing companies with glass fiber reinforced polyester resin trays has demonstrated the corrosion resistant properties, usefulness, and economies of this type of plastic tray or box for material handling purposes.

R. P. Scherer

The Gelatin Products Division of R. P. Scherer Corp. in Detroit reports a 25% reduction in capsule drying time after it switched to the polyester trays.

Scherer's trays, which replace enameled steel containers, are made by combining polyester resin, a liquid thermosetting plastic, with glass fiber and then pressing the material into the desired shape in matched steel molds under hydraulic pressure. Material forms a hard, infusible solid with high corrosion resistance, a strength-weight ratio greater than steel, and the dimensional stability required for precision work.

Designed by R. P. Scherer Corp. engineers in cooperation with tray manufacturer, trays last indefinitely without repairs or other maintenance, such as painting or straightening.

According to R. P. Scherer,

the plastic trays provide better resistance to chemical action, last long, and eliminate corrosion problems, paint chipping, denting and bending. After the polyester trays went on the production line, time required to dry capsules was reduced 25% as a result of the improved design which was made possible by the plastic material in the trays.

Plastic trays do not absorb as much heat as metal trays in the drying tunnels. Open sides of the plastic trays funnel warm air over capsules in the middle of each tray where material formerly was the slowest to dry. It was also discovered that the ends of the trays fit together more snugly so that less warm air leaks out between stacked trays. A 30% increase in the flow of warm air over capsules resulted.

Eliminated was the previous practice of enameling steel trays for easier cleaning and resistance to corrosion. Plastic trays require no paint on their smooth, non-porous surfaces and their rounded corners afforded no nooks or crannies for bacteria.

R. P. Scherer uses the trays in the manufacture of vitamin and other types of gelatin capsules. Trays carry the capsules through various manu-

facturing operations there.

National Aniline

National Aniline Division of Allied Chemical Corporation in Buffalo, N. Y., lists cost savings—resulting from longer life—ranging from 15 to 40% when plastic pans were used.

This plant found that molded fiber glass trays have the advantage of light weight, corrosion resistance, freedom from rust, less danger of fracture damage during handling, and longer life, adding:

"The greatest advantage lies in the substitution of plastic pans for enamel pans which often crack and chip during handling and are subsequently subject to corrosion and rusting."

American Cyanamid

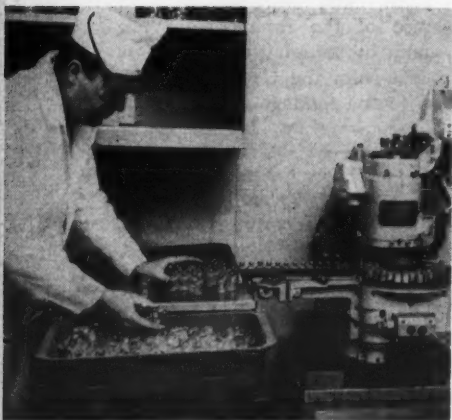
The Plastics and Resins Division of American Cyanamid Co., New York City, reports that the plastic trays are used at plants in Bound Brook, N. J., and Willow Island, W. Va., for drying dye intermediates, pigments and other corrosive chemicals. Company reported:

"Examination of the trays at the end of six months service revealed them to be highly

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Corrosion-resistant molded glass fiber tray is used for dehydrating chemicals in dryers. Resistance of tray to moisture, acids, dilute alkalis and most other chemicals prevents harmful reactions between tray and content



Vials being handled in plastic trays at Sharp & Dohme Division of Merck

Teaming intensive research with efficient processing equipment, paint company finds that it can combine premixing and grinding into one operation. Achieving in minutes what used to take hours, installation . . .

Decreases Pigment Dispersion Time Over 80 Percent

TED F. MEINHOLD, Associate Editor
with **STANFORD GUGGENHEIM***
Technical Director
Decatur Chemical Company

Problem: A faster and better way of performing pigment grinding operations was sought by Decatur Chemical Company, Decatur, Georgia. The program was part of the firm's continuous efforts to further improve the quality of its paint products and boost production efficiency.

Existing process involved two separate operations — premixing in conventional 40-hp lead mixers, followed by grinding in dispersion mills. Each batch (about 80 gal) took from two to three hours to complete.

Transferring materials between units was tedious and time-consuming. Operating costs for the individual machines were also high. Dry pigments caused excessive wear on the mills, resulting in considerable maintenance.

The company produces wide variety of Prince brand paints. These range from exteriors, alkyds, and enamels to lacquers, stains, industrial finishes, and latex paints.

Solution: An intensive experimental program was initiated involving high-speed impeller-type equipment. Preliminary tests indicated that this kind of unit might permit combining premix and grinding into one operation.

Dispersion in the equipment involves kinetics of both mixing and grinding. The vehicle mix must be fluid enough to allow flow into all corners of mixing tank, yet stiff enough

to exert shear forces that will break down agglomerates of pigment particles.

It was found that in order to produce an acceptable grind in a reasonable time, the impeller blade had to turn at a radial speed of about 5000 fpm. Blade size had to be approximately 1/3 diam of tank. Practical lower limit of liquid level in tank was established to be 1/2 diam of impeller. Upper limit was about two diameters.

Production trials were started using a 20-hp and a 10-hp impeller-type machine. Known as Cowles Dissolvers, speed and effectiveness of equipment is due to its patented stainless steel impeller. Direct mechanical action imparts extremely high velocity

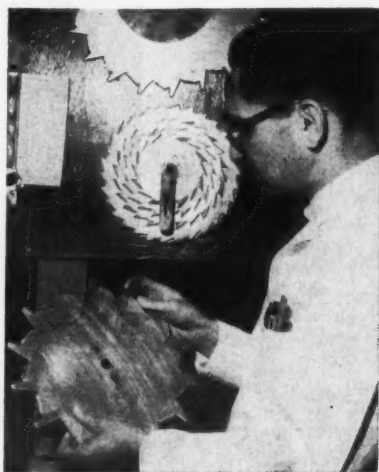
to material, creating a zone of intense turbulence immediately surrounding impeller.

Product is forced rapidly outward through itself. As the high velocity material impinges on surrounding slower moving portions, hydraulic attrition takes place. This attrition is a combination of violent impact and shearing of particle against particle. The hydraulic action greatly multiplies mechanical action of impeller.

In the production batches, vehicle and pigment were alternately added to the mix, keeping consistency as heavy as possible until all of pigment was in the batch, and a nice "roll" developed. This meant that when blade was

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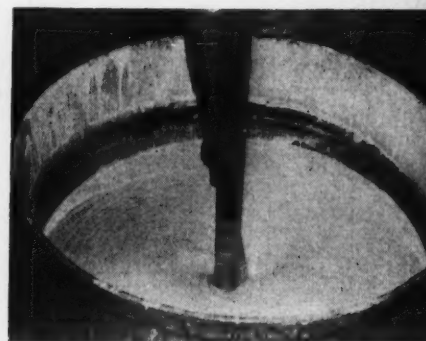
High-speed impeller-type unit is equipped with hydraulic system for adjusting impeller to exact position



Constructed of stainless steel, impellers are shaped and sized to perform variety of operations



Technical Director Guggenheim keeps close tab on quality of all products produced at the plant



Revolving at radial speed of 5000 fpm, impeller efficiently premixes and grinds pigments in one operation

* Winner, 1958 Buckman Award, presented at Annual Meeting of the Southern Paint and Varnish Production Club in Atlanta, Ga.

Here's another example of how teamwork between user and supplier can pay off. Resulting in a better product at lower costs, while at the same time claiming a 'first' in the field, Midwest Solvents produces . . .

Spray Dried Vital Gluten

TED F. MEINHOLD, Associate Editor
with KEITH KILANDER, Director of Research
and M. L. WALTERS, Chief Chemist
Midwest Solvents Company, Inc.

Problem: Weaknesses in existing processes for producing vital gluten discouraged Midwest Solvents Company, Inc., Atchison, Kansas, from adding this material to its line of products. Although very much interested in entering the field, company was postponing this move until it could find improved production techniques that would insure turning out a top quality product. Vital gluten is widely used for food enrichment.

Biggest stumbling block seemed to be drying and grinding operations. Conventional methods were time-consuming, laborious, and expensive; requiring rigid control at all times to prevent product deterioration. The grinding step was especially troublesome in this respect.

Solution: Preliminary investigation indicated that vital gluten might be produced by spray drying. Although never

before tried on a commercial scale, such a process, if successful, could result in the production of an improved, more uniform product — faster and more economic. Added bonus: it would entirely eliminate the grinding step.

With high hopes for the future, the firm engaged the research staff of Buflovak Equipment Division, Blaw-Knox Company, to conduct detailed studies on the subject. Extensive experimentation proved that the process would work, providing that a special aqueous dispersion technique was used. The dispersing agent, added in early stages of process, breaks up the gluten particles so they remain suspended within the solution prior to drying. Dispersant disappears during spray drying operation.

The spray-drying phase is under positive control at all times. This assures minimum

exposure of the product to heat, and instantaneous drying so that the particles have the fine consistency of flour. Grinding, with its inherent danger of quality deterioration, is not required.

The dry gluten retains all of its native properties, and regains its original vitality (or elasticity) upon being reconstituted with water. The remixed gluten "gum" cannot be distinguished from the native material and readily forms a cohesive elastic mass.

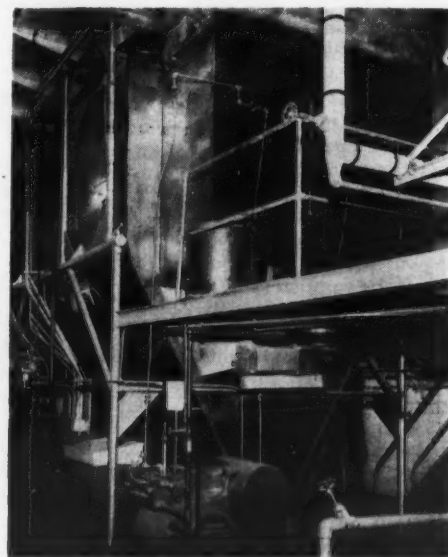
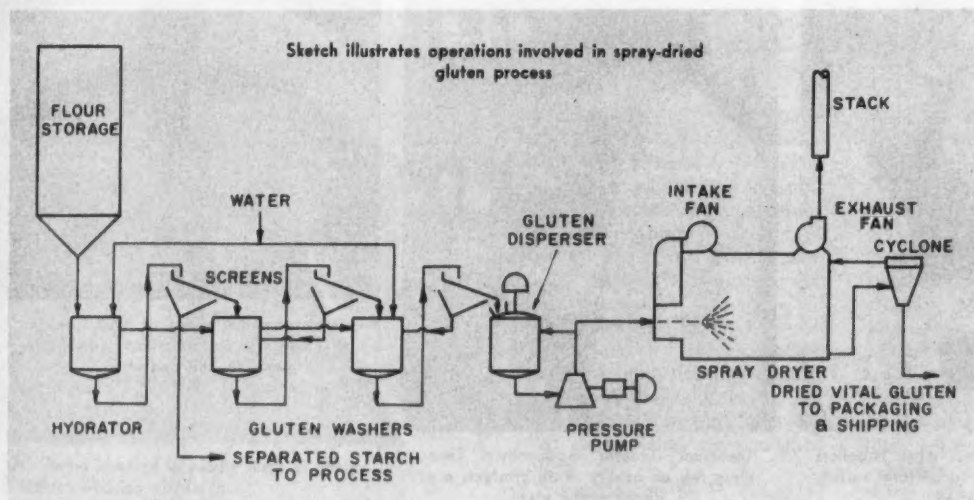
Results: Midwest Solvents now boasts possession of the first successful spray drying application in the gluten field.

The dryer installed is all stainless steel, measures 28x18x10', and continuously produces up to 700 lb of 5% moisture material per hour. The gluten is dried almost instantly, retention time being only about one minute.

Heated air enters dryer at 400°F and is exhausted at 180°F. Temperature of dried gluten leaving unit is 103°F. Air flow through dryer is 17,000 cfm. Natural gas is used as fuel, approximately 5000 cfh being consumed at peak production.

Finished product has uniform particle size and is free

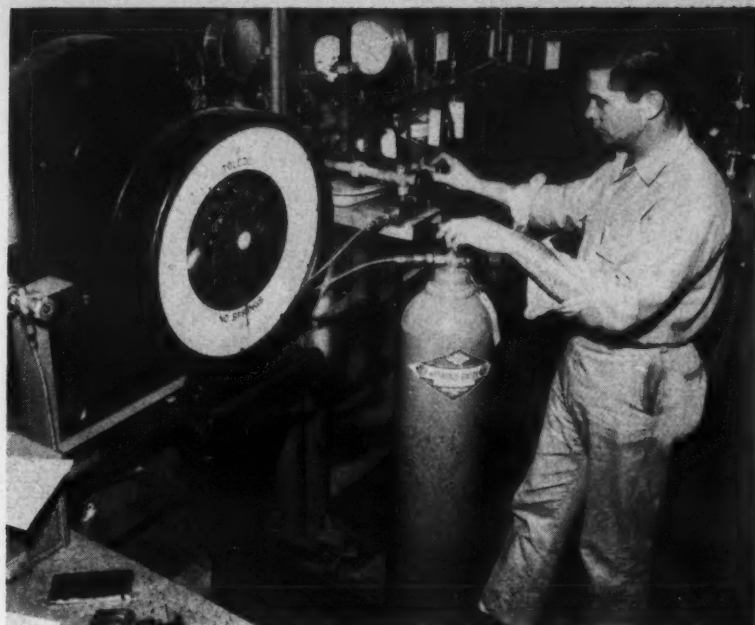
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Stainless steel spray dryer measures 28'x18'x10', can produce up to 700 lb of 5% moisture vital gluten per hour

Weighing is more accurate with fluorocarbon hose which is flexible and does not frost

While previous types of flexible hose and tubing failed in a few weeks due to flexing, hose made of Teflon and stainless steel has lasted nine months without a failure



HOSE OF TEFLON HANDLES HELIUM and NITROUS OXIDE at 2200 PSI

GEORGE W. KISER, Plant Supt.
Ohio Chemical Pacific Company
Division of Air Reduction Company, Inc.
with CP STAFF

Problem: A number of different types of hose used for filling cylinders with nitrous oxide, helium, and carbon dioxide lasted only two to eight weeks. Gases are transferred at 800-2200 psi and temperatures down to 0°F. Repeated flexing caused hose to fail. Also, inflexibility of former hose interfered with accurate weighing. Frosting of hose also resulted in inaccurate weighing.

Semi-rigid metal tubing was used for 20-cylinder, manifold setup, known as pigtail section. Because cylinders vary in height, some metal pigtails lasted only 2 to 3 months.

Solution: Plant switched to hose and fittings made of Teflon and stainless steel for the compressed gas filling operation.

This hose consists of an inner tube of heavy-gage extruded Teflon. Reinforcement consists of multiple plies of

synthetically bonded, spirally wound Type 302 stainless steel wire over a full coverage, braided stainless inner layer. Outer cover is braided 302 stainless steel wire.

Hose is used for filling as many as 300 hundred-lb cylinders of N₂O per day at 1500 psi and 0°F. The fluorocarbon hose is also used for 100-lb cylinders of nitrous oxide at 2200 psi — helium at 2200 psi — and carbon dioxide.

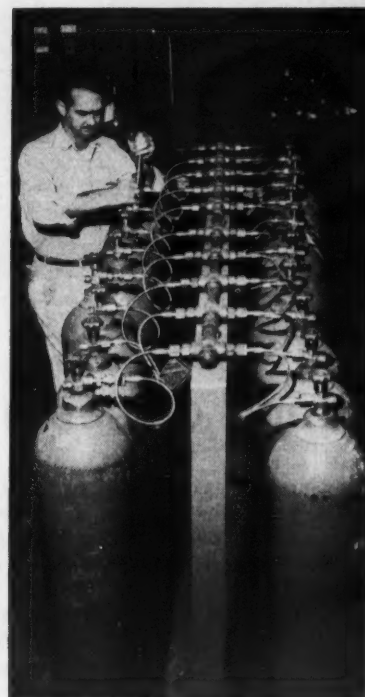
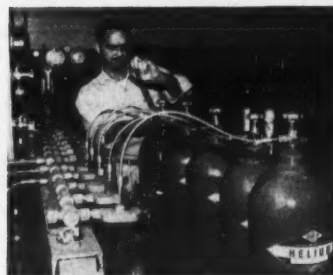
Results: Hose of Teflon has been in use for more than nine months without a failure in spite of constant flexing at high pressure and low temperature. Hose is flexible enough not to interfere with weighing. Also, because hose does not frost, weighing is more accurate.

(Hose of Teflon is product of Aeroquip Corporation, Jackson, Mich.)

Check 2650 opposite last page.

Repeated flexing in pigtail section has not hurt hose being used for filling 100-lb cylinders of N₂O at 2200 psi

Trans-filling manifold, where small cylinders are filled from large ones. Here helium is being handled at 2200 psi





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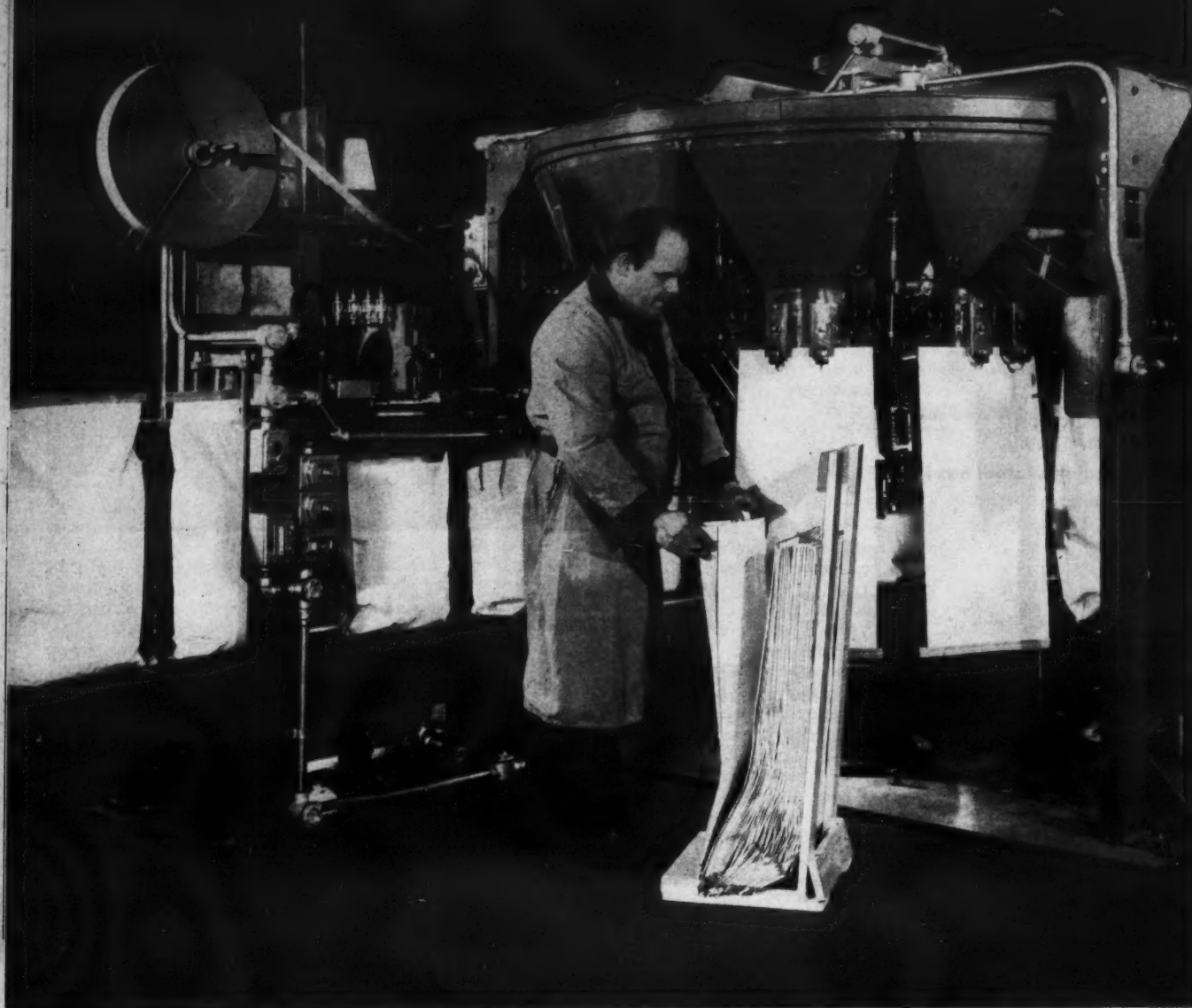
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WITH THIS engineering marvel at his command, the *one man* in our picture can package from 15 to 25 BPM. And he can *instantly* adjust the rate of speed through the machine's variable drive.

The operator simply hangs empty multiwalls on the hopper spouts as the 10-station turret rotates past him. The Model AF Bagpaker takes over from there.

It accurately *weighs* any free-flowing or semi-free-flowing material, quickly *fills* the bag, *settles* it by vibration, automatically *preforms* the top, and *stitches* it tight. You can choose from nine different closures. Bagpak's exclusive "Cushion

Stitch," a reinforced two-thread double-lock chain stitch, is standard equipment.

The Model AF Bagpaker is ruggedly constructed of heavy welded steel throughout. Gears are fully enclosed and bathed in oil. Critical parts are of *stainless steel*.

There is a Bagpaker model for every need. They range from the completely automatic Model "A" Bagpaker, capable of packaging up to 60 tons per hour, to small, manually operated economy models.

Whatever your multiwall packaging needs, it will pay you to talk to your Bagpak sales and service representative.



Plastic Trays*From page 28*

satisfactory for neutral or acid conditions. Interviews with operating personnel disclosed their satisfaction."

Merck

Successful experiments by Merck, Sharp & Dohme Division of Merck & Co., Inc., with molded fiber glass pans ended the company's search for a standard container to handle biological products between filling and labeling operations. The lightweight pans replaced wooden boxes formerly used to handle polio vaccine vials and other biological products. One feature especially pleasing was that the molded fiber glass trays do not contaminate materials being processed.

Generally speaking, molded fiber glass containers are resistant to non-oxidizing acids, corrosive salts and weak alkalis. They are satisfactory for many alcohols, formaldehyde, refinery crudes and gasoline but are not useful with chlorinated solvents or strong alkaline solutions.

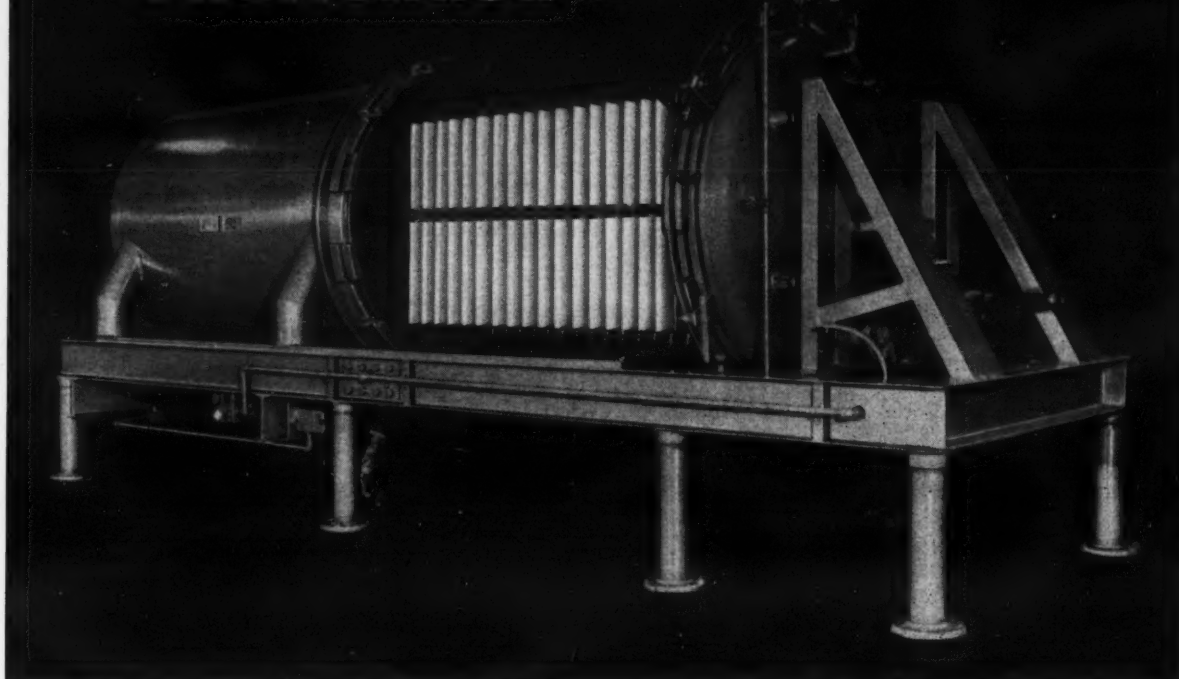
Drying trays and other products used in chemical processing under corrosive conditions are available in various sizes, according to customer specifications. Majority of the trays, pans, and boxes now in use have been engineered jobs rather than standard products. Largest chemical drying tray molded is an example. It measures 47½" long, 23¾" wide and 2¼" deep.

Molded plastic trays have an average impact resistance of more than 15 ft lb and a flexural strength of 30,000 lb/sq in. Smooth working surface withstands daily loading, unloading, scrubbing, dehydrating, freezing, and rough handling. Containers are stable over a temperature range from minus 60 to more than 275° Fahrenheit.

(Toteline plastic trays are product of Molded Fiber Glass Tray Company, Linesville, Pennsylvania.)

Check 2652 opposite last page.

Now Available Completely Automated for Continuous Operation Unattended—



SPARKLER Model MCR-S FILTER

This heavy duty, large volume filter, will give fine filtration as well as handle products with a high percentage of bulky solids. Model MCR-S filters now in service, equipped with completely automatic operating controls are performing day after day without attention. Precoating, filtering, blow-down to a dry cake, cake discharge and resuming the

filtering cycle, all automatic. Write for details of this new self operating filter. Capacities up to 1000 sq. ft. of filtering surface.

Consult Sparkler for the latest proven developments in filtration. Originators of the Horizontal Plate Filter and Fully Automatic Horizontal Leaf Filters.

**SPARKLER
FILTERS**

**SPARKLER MANUFACTURING CO.
MUNDELEIN, ILLINOIS, U. S. A.**

Sparkler International Ltd., Manufacturing Plants at Leliegracht 9,
Amsterdam, Holland; Toronto, Ontario, Canada; Italy and Australia.

FILTRATION ENGINEERS AND MANUFACTURING EXCLUSIVELY FOR OVER 35 YEARS

Check 2653 opposite last page

Pigment Grinding

From page 29

between 1/3 and 1/2 liquid level from bottom of tank, about 1/3 of the area of the blade could be seen, and the paste was being pulled from outer edges of tank without splashing. Round tanks without baffles were found to be best.

As more and more batches were run, it was found that for each vehicle, a definite pigment-to-vehicle ratio gave best results. A formula for determining an oil absorption factor on any vehicle was worked out to give an ideal consistency paste. This formula is:

$$F/c = 0.90 + \frac{VS}{145} + \frac{P}{40}$$

where F/c = Oil absorption factor for high speed impeller equipment

VS = Percent vehicle solids

P = Viscosity of vehicle in poises

By calculating the oil absorption factor for each of the commonly used oils in the plant, it became a simple matter to calculate how much oil was necessary in each batch to produce a good grind.

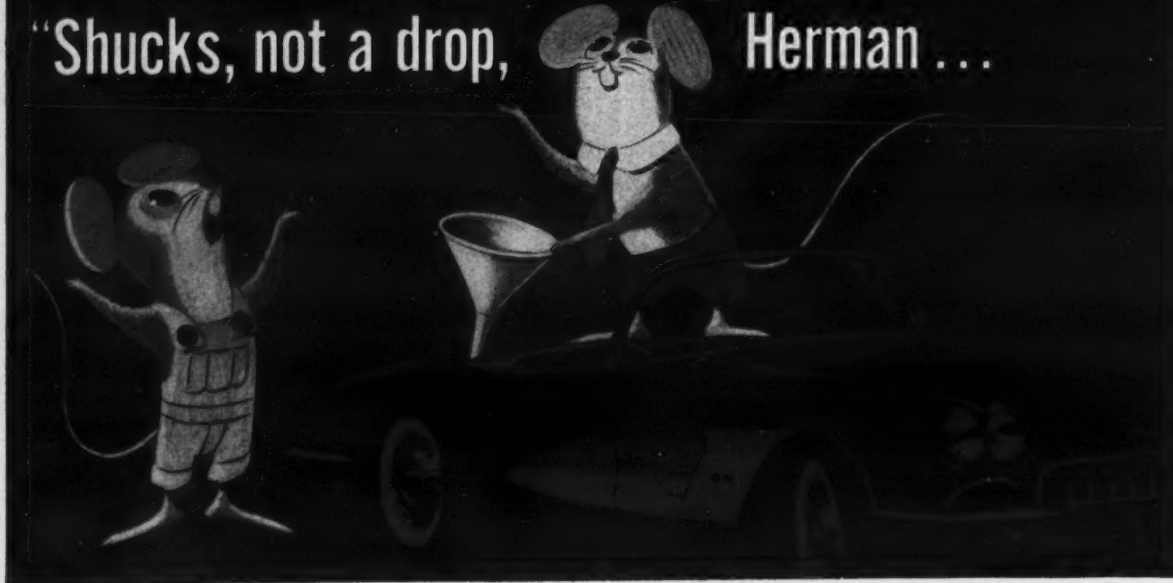
It was also found that improved grinds were obtained when puffing and gelling agents were omitted from the grind, or at least held off until the pigments were dispersed, and put in at very end of grind.

Results: Premixing and grinding steps have been successfully combined into one operation. Batches that used to take two to three hours are now finished in only 20 minutes. Uniformity of products has improved and overall operations have been greatly simplified.

All formulations not containing heat-reactive pigments are processed in the impeller-type equipment. The machines have proven to be extremely versatile and flexible, being also used for numerous other mixing, dispersing, and deagglomerating jobs.

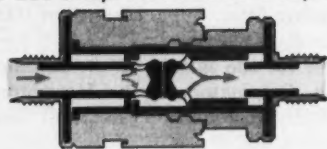
Maintenance on units is

"Shucks, not a drop, Herman ..."

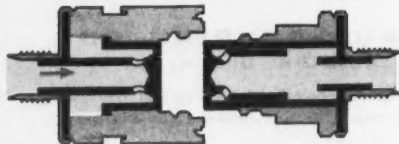


... it's a no-spill valved coupling by Snap-Tite!"

To use Snap-Tite Valved Coupling:



CONNECT—Full flow instantly



DISCONNECT—Stop flow instantly

The 15 Series valved coupling automatically snaps off the flow of the most volatile fluids when disconnected—with no leakage.

Snap-Tite's 15 Series valved coupling contains valves in both sections. Thus, the only fluid lost is that which clings to the outer metal surfaces. This coupling meets military specifications and can be used with fuels and other fluids to 3000 psi working pressure and 400°F. Sizes: 1/4", 1/2", 3/4", 1" in 6061T6 aluminum anodized; 3/8" in steel (electroless nickel plated), and 6061T6 aluminum.

Snap-Tite can provide the right valved coupling—with quick off-on action wherever coupling or shut-off is required—for most any use, most any fluid.

For more information, write for Snap-Tite Catalog #15. Snap-Tite representatives in all principal cities.

Snap-Tite

UNION CITY 6, PA.

ST-59-03

Check 2654 opposite last page

NEW SOLUTIONS

simple. Impellers are easily demounted from shaft for replacement or change. Self-cleaning effect of rotary action helps keep impeller free of plugging from solids. Hydraulic lift arrangement on machines permits impellers to be raised or lowered to exact position with minimum effort.

(Further information about Cowles Dissolvers may be obtained from Morehouse-Cowles, Inc., 1150 San Fernando Road, Los Angeles 65, California.)

Check 2655 opposite last page.

Vital Gluten

From page 30

of foreign odors, tastes, and contaminating substances. Final analysis is as follows:

	Wet Basis	Dry Basis
Moisture, %	5.50	
Protein, %	77.15	81.64
Crude fiber, %	0.32	0.34
Starch, %	7.16	7.58
Fat, %	0.80	0.84
Ash, %	0.98	1.04
NFE, %	8.09	7.60

Screen specifications are: Over #60, 6% max; #80, 29%; #100, 22%; #140, 2%, and through #140, 14% min.

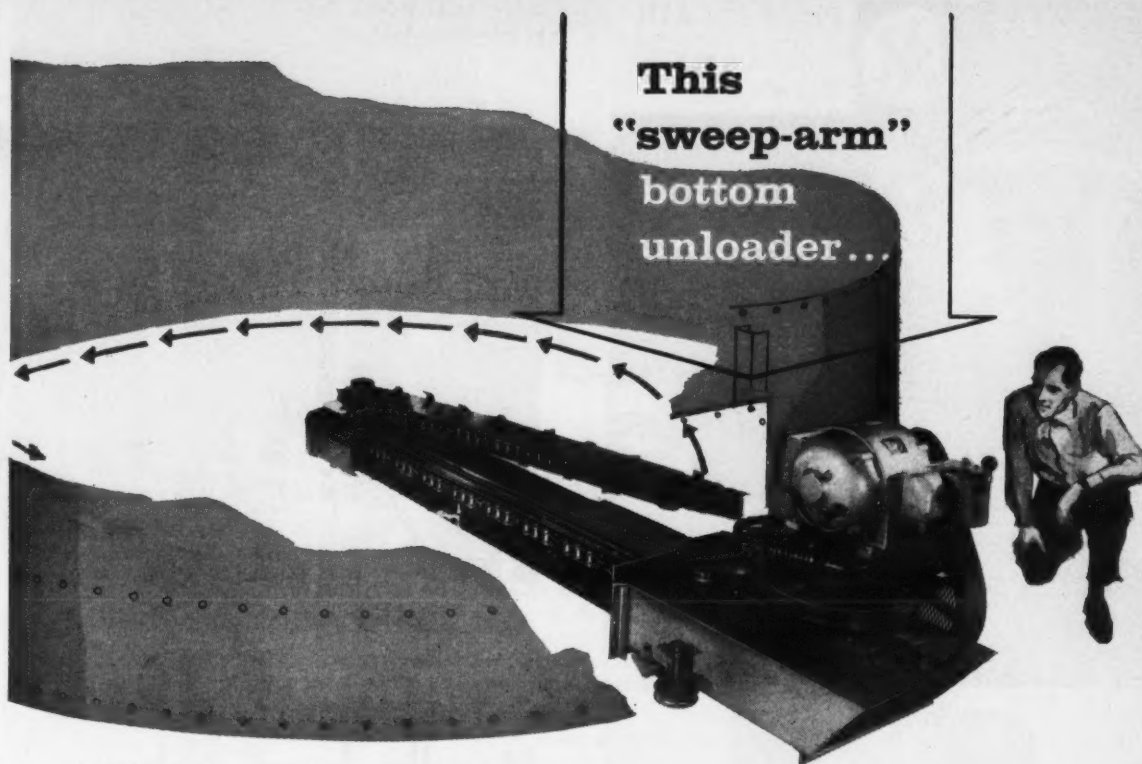
Production is fast and economic. Labor requirements are only a fraction of that needed for conventional gluten manufacturing processes. Tests have shown that the dispersion-spray drying technique can be used for drying gluten produced by any method.

(Additional information about dryer or spray drying process may be obtained from Buflovak Equipment Division, Blaw-Knox Company, Buffalo, New York.)

Check 2656 opposite last page.

(Further information about Midsol gluten can be obtained from Midwest Solvents Company, Inc., 1300-10 Main Street, Atchison, Kansas.)

Check 2657 opposite last page.



is the key to a completely mechanized materials-handling system

Exclusive with **Permaglas**[®] Mechanized Storage Units,

the mechanical sweep-arm bottom unloader provides the first *reliable* method for automatically discharging bulk materials into your conveying system, on a first in first out basis. Result: substantial labor savings — elimination of costly bags, bins, barrels, fork trucks and the expense of maintaining this equipment.

If your operation involves the storage or movement of granular, flaky or pulverized; hygroscopic, corrosive or contaminable; edible or non-edible or hard-to-handle bulk materials — it will pay you to see how Permaglas Units can mechanize the storage of these materials. For more details on these unique structures and the operation of mechanical sweep-arm bottom unloader, mail coupon below.



Modernize your bulk materials handling with A. O. Smith Permaglas Mechanized Storage Units. In the totally enclosed Permaglas Mechanized Storage Unit System shown above, incoming bulk materials are conveyed directly into the Permaglas Unit. Sweep-arm bottom unloaders discharge material into the pneumatic conveying system which delivers it to the processor's line.

Further, these unique steel structures — glass-protected inside and out* — are completely sanitary, provide contamination-free storage and require a minimum of maintenance!

*HYDRASTEEL — Process covered by U.S. Patent No. 2,754,222

A. O. Smith Corporation, Dept. CP-79, Kankakee, Ill.

Please send me, without obligation, information on how Permaglas Mechanized Storage Units can be the HEART of my materials handling system.

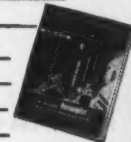
I am particularly interested in the movement and storage of: _____

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____



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A.O. Smith

HARVESTORE PRODUCTS

Kankakee, Illinois,

A. O. Smith INTERNATIONAL S.A., Milwaukee 1, Wis., U.S.A.

Check 2658 opposite last page



PROPELLAIR®
Ventilating
Equipment



Electronic speed
test in Propellair's
wind tunnel

FOR RUGGED DUTY... NEW design axial fans In sizes up to 60 inches!

Move corrosive or explosive fumes, extreme heat or high humidity with new PROPELLAIR Type BT belt driven axial fans. They feature heavy 10 and 12-gage drums . . . isolated, air-cooled, protected bearings and belts . . . airfoil propellers cast of hi-strength aluminum-magnesium alloy . . . Robbins & Myers "All-Weather" motors for a single nameplate guarantee on the complete unit.

Hi-pressure, big hub propellers are available for those tough applications developing high resistance.

Send today for complete information on this modern, efficient fan. Ask for Bulletin 620—CP

PROPELLAIR®

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SKY-BLAST®
ROOF VENTILATOR



TUBE AXIAL
FAN



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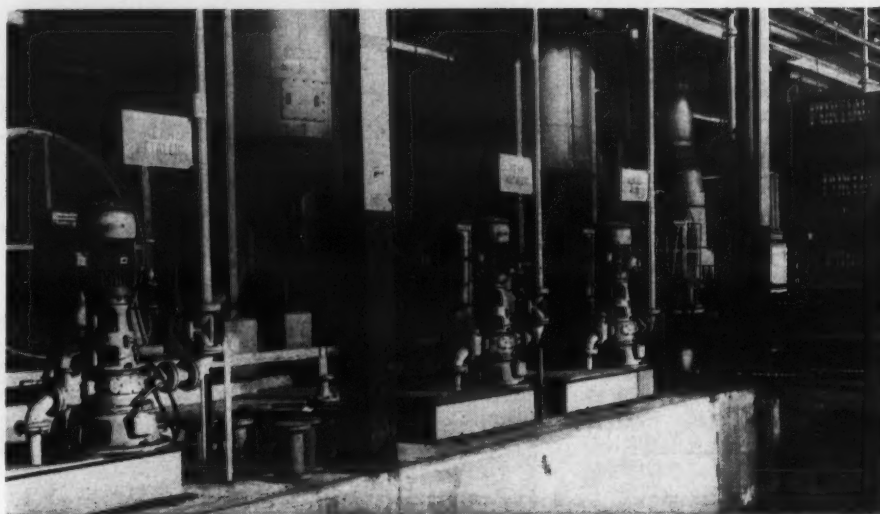


MAN
COOLERS

MOVING AIR IS OUR BUSINESS®

Check 2659 opposite last page

NEW SOLUTIONS of processing problems



Handle huge volume of corrosive wastes with vertical pumps

About 150 of the five-foot high centrifugal units, most of which operate automatically, have required a minimum of maintenance while transferring more than a million gallons per day of acid, alkaline, and chemical solutions to waste treatment plant

BASIL E. BROWN, Assistant Plant Engineer
Pontiac Motor Division, General Motors Corporation
with CP Staff



Vertical pumps in another area at General Motors plant

PROBLEM: When a large waste treatment plant was being planned at the Pontiac Division of General Motors, a search was made for suitable pumps to move the large volume of chemical solutions from operating areas to treatment plant.

Most of waste comes from plating operations although some is an alkaline wash solution used to clean various parts before assembly. Volume of liquids to be transferred to waste treatment plant consists of a total quantity of 1,250,000 gal per day of strong acid solutions containing copper, chromium, and nickel—cyanide solutions—and a solution called alkali oily from cleaning operation.

Solution: After consideration of other pumps, plant installed about 150 Type CG vertical pumps since they were believed

CHEMICAL PROCESSING

Two chromium-nickel alloys are used in construction of vertical pumps to withstand corrosives encountered

to be the most satisfactory for the operation. Most of the pumps are in the plating plant where they are connected to a 600'-long series of pits alongside the electroplating system. Majority of other pumps are attached to washing machines in various parts of the plant.

Design of Pumps

Unit is complete on a platform above the floor. A pipe on suction end is all that goes down into pit. Pumps are self-priming and have a capacity of 100 gpm at 75 psi pressure. Most of the pumps are operated automatically. When the level of the liquid in the tank rises so far, pump goes on and when level drops, pump goes off.

Pumps have two features that have proved to be of advantage at Pontiac Motors. One is a strainer at the intake point. The other is a device to allow a visual check to see if pump is operating. This device is a small unit which pumps a small portion of liquid back into a tank after it has been drawn up. When an operator sees liquid going back into tank, he knows pump is operating.

This vertical centrifugal pump has no stuffing box, shaft packing, or mechanical seals in running contact with liquid. Pump is sealed in operation by a dynamic seal using the liquid being pumped.

Pump has but one running part — the impeller with its integral hydraulic seal. Drive shaft enters pump on suction side. Hence, seal under suction lift conditions is required to work only against atmospheric pressure.

Alloys in Pump

Three materials of construction are used for pump — cast iron, 149 alloy, and



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CAMBRIDGE does . . .

To assure you of wire cloth fabrications that give long and satisfactory performance, we have experienced engineers who can draw up prints for your approval if necessary, and trained production men who can quickly and accurately fabricate parts to your most rigid specifications.

To fill your most diversified bulk wire cloth needs, we have thousands of items in stock—in all meshes, wire sizes, metals or alloys—ready for prompt delivery.

Modern machinery, careful workmanship and constant inspection assure you of exact mesh count and mesh size. And, our field engineers follow up your order to see that our product is giving the best possible service.

We make wire cloth from any metal or alloy—including titanium—in nine basic weaves—from finest to coarsest mesh. Call your Cambridge Field Engineer for information. He's listed in the yellow pages under "Wire Cloth". Or, write for FREE 94-PAGE CATALOG.



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Manufacturers of Wire Cloth,
Metal-Mesh Conveyor Belts, Wire Cloth Fabrications



Check 2660 opposite last page

NEW SOLUTIONS

Elcomet K. The 149 alloy contains 14% chromium and 9% nickel. The Elcomet K, an extremely corrosion-resistant alloy, contains 20% chromium, 26% nickel, 2% copper, and 3% molybdenum.

Results: Pontiac is highly pleased with performance of pumps during the more than two years they have been in service. Only a minimum of maintenance has been required on them. They have satisfactorily handled the huge volume of more than a million gallons of corrosive waste per day.

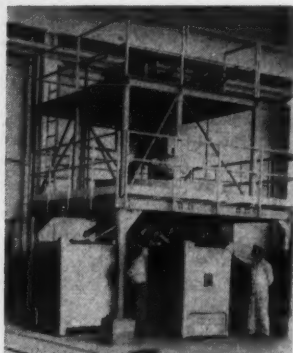
(Type CG vertical pumps are product of The La Bour Company, Inc., Elkhart, Ind.)

Check 2661 opposite last page.

Time and space created by bulk-handling bins for titanium sponge

Inventory records simplified by aluminum containers

Problem: Titanium sponge was transported and stored in non-durable small-capacity fiber drums, requiring excessive handling and extensive

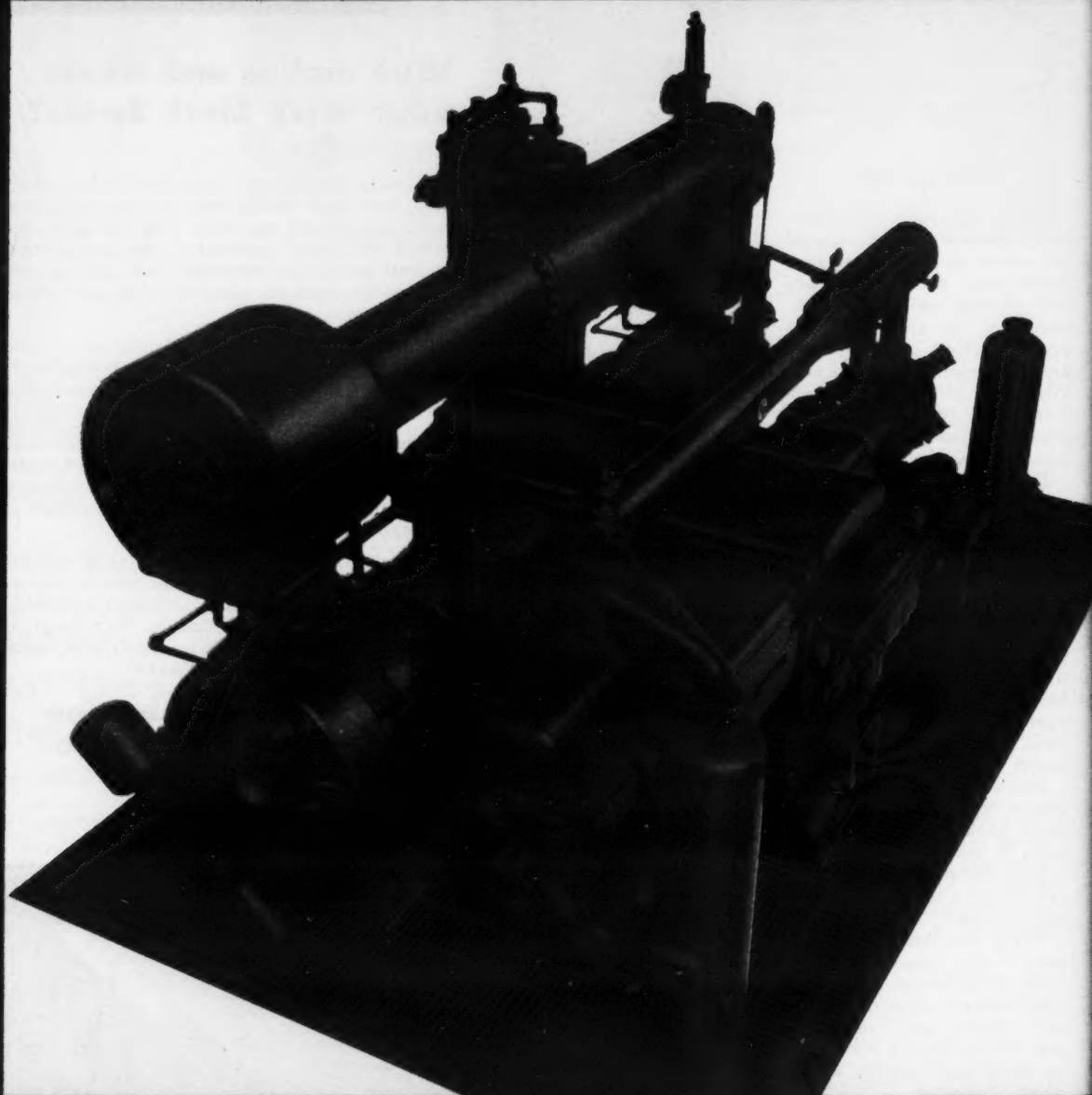


Bins are used to transport titanium sponge to and from blending tower. Self-discharging design of bins expedites this operation

storage space at Mallory-Sharon Metals Corporation, Niles, Ohio.

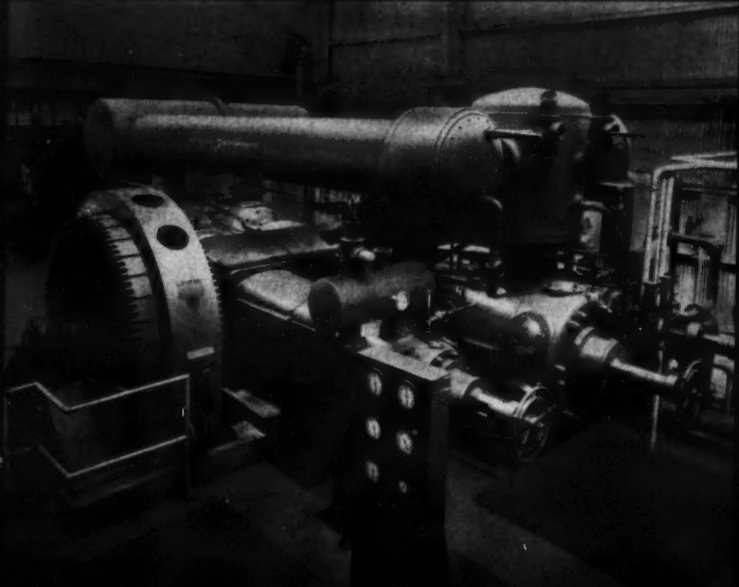
The 600-lb-capacity 55-gal drums were used to move gravel-like titanium sponge from reduction facilities in Ashtabula, Ohio, to nearby

CLASS FE FOR PROCESS WORK



2000 HP four-stage, Class FE 44 compressor

COMPRESSORS



The Class FE Compressor is one of several types available for process work. Readily adaptable in single and multi stage designs for low or high pressure service, these balanced opposed compressors require a minimum of attendance and insure maximum availability.

- ★ Suitable for direct motor drive or gear drive
- ★ In sizes to 5,000 horsepower
- ★ For pressures to 15,000 pounds or vacuum service

2500 HP five-stage Class FE 55 compressor

Niles. Containers could be used only two or three times.

Small capacity of drums contributed to inefficiency of operation. Containers did not lend themselves readily to efficient storage procedures. In addition, they required considerable awkward manual handling.

Solution: Sixty aluminum bulk-handling bins were leased in middle of 1957 to transport and store titanium sponge. Hermetically sealed bins are 74 cu ft in size and have 5000-lb capacity.

Titanium sponge is carried from Niles to Ashtabula on common-carrier flatbed trucks. At destination bins are removed from trucks by fork-lift truck or overhead crane.

Containers are then weighed, recorded, and returned to storage.

When sponge is to be used, overhead crane moves bin to blending tower where it self-discharges titanium. Material is cascaded from tower into any one of several empty bins below.

Blended raw material is next tested, evaluated, and held in storage. Then bin is carried to feed hopper and self-discharged.

Results: Since operation began, handling costs have been reduced by 30 to 50%. Unloading time is considerably less than that formerly required.

A 50% storage-space saving has resulted from tiering of aluminum containers in warehouse. Inventory records have been simplified. During travel, hermetic seal of bin gives complete protection of sponge.

(Hermetically sealed aluminum bins are product of Tote System, Inc., Beatrice, Neb.)

Check 2663 opposite last page.

Space guide—Research, development, production, and procurement aspects pertaining to this new field are discussed in 150-page book. The non-technical publication tells those interested in space contracts where to go, who to see, and cites other valuable information. "Space Guide" may be purchased at \$10.00 per copy from Vincent F. Callahan, Publisher, Evans Building, Washington 5, D. C.



Chicago Pneumatic

8 East 47th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • DIESEL DRILLS • HYDRAULIC TOOLS

Check 2662 opposite last page

These pumps are designed especially for handling high temperature liquids. The following description will help you evaluate the suitability of these pumps for this specialized service.

In addition to these special features, "Buffalo" High Temperature Pumps bring you the famous "Buffalo" hydraulically efficient impeller and casing design. Accessibility, dependability and long, maintenance-free life are important *extra* values in every "Buffalo" Pump.

Whatever your heat transfer problem — including vapor phase — phone your "Buffalo" engineering representative for full information.

Only "Buffalo" Pumps bring you the famous "Q" Factor — the built-in **QUALITY** that provides trouble-free satisfaction and long life.

BUFFALO PUMPS

Division of Buffalo Forge Co.

524 Broadway, Buffalo, N. Y.

Canada Pumps, Ltd., Kitchener, Ont.

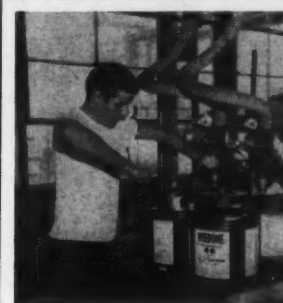
Sales Representatives in all
Principal Cities



**FOR
MOVING
HEAT
TRANSFER
LIQUIDS...
RELY ON
"BUFFALO" HIGH
TEMPERATURE
PUMPS**



Check 2664 opposite last page



Phenolic-lined containers

... of steel are used at the St. Joseph, Mo., plant of Amchem Products to hold weed-killing formulations.

Lined pail and drums are utilized to preclude formation of insoluble metal salts which could clog spray nozzles handling the weed killer.

Storage in conventional unlined containers for long periods could result in formation of enough sediment to initiate such clogging effects.

(Phenolic-lined steel containers are product of Container Division, Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pa.)

Check 2665 opposite last pg.

Increased acid resistance given unloading points by swivel joints

Units handle 8000 gallons of H_2SO_4 per day

Problem: When a large mid-western steel company began receiving sulfuric acid at 66 Be' strength in place of 60 Be' previously used, acid-proof rubber hose, utilized as flexible connections at acid unloading stations, failed within two weeks. Replacement hose remained in service only slightly longer.

A typical acid unloading station handles 8000 gallons per day of 66 Be' sulfuric acid. Temperature of acid varies according to ambient conditions since stations are not

NEW SOLUTIONS

enclosed and deliveries are made on a year round basis.

Solution: In May of 1955 acid unloading stations were fitted with flexible unloading arms consisting of 2½" steel pipe welded to cast steel high-temperature swivel joints. Joints are standard units rated to pressures of 700 psi and temperatures of 500°F, with stainless steel ball bearings, flame-hardened races, and hard-chromed packaging chambers. Packing is Teflon.

Arms are counterweighted to assure ease of handling and greased periodically with acid-proof grease. Installation utilizes three swivel joints and two 4-ft steel pipe sections to permit rotation and swing to any required angle.

Results: Unloading arms have been in continuous service since installation without a failure. Coupling to acid truck is easily made by bolted flange, regardless of truck positioning. Maintenance costs are low since periodic greasing is only attention required.

(Swivel joints are a product of Chiksan Co., a Subsidiary of Food Machinery and Chemical Corp., Brea, Calif.)

Check 2666 opposite last page.



"My wife is thinking of suing you for non-support!"

Steam-line maintenance is reduced over 60% with filming amine

Corrosion and trap clogging reduced by thin film

Problem: Pipe corrosion and steam-trap clogging required replacement of 18 to 20 corroded pipe nipples every three weeks at Whippany Paper Board Company's Clifton, New Jersey, plant.

Extraction steam, at approximately 45 psi, is used in more than 261 dryers on each of plant's two 300-tons/day paper machines.

Solution: A filming-amine product was added to boiler feed water. Material volatilizes in boiler. It passes over with steam and, from point of condensation onward, forms thin, continuous non-wettable film. Film thus formed protects all metal surfaces against corrosive influences.

Batches of filming agent are made up every eight hours, using hot condensate at temperatures between 130 and 170°F.

Results: Steam-line maintenance has been reduced more than 60% since film has been in use. Pipe nipples now last up to three years.

Surface temperature of dryers has increased approximately 20°F. For each ton of board produced daily, 180 lb of coal are saved with the new procedure in use.

Metal test strips were installed at several locations for five-month test period, in order to determine effectiveness of film treatment. Strip at outlet of turbo-generator showed weight loss of only 0.0155 grams and corrosion rate of 0.4 mg/dm²/day (.0007" penetration/yr).

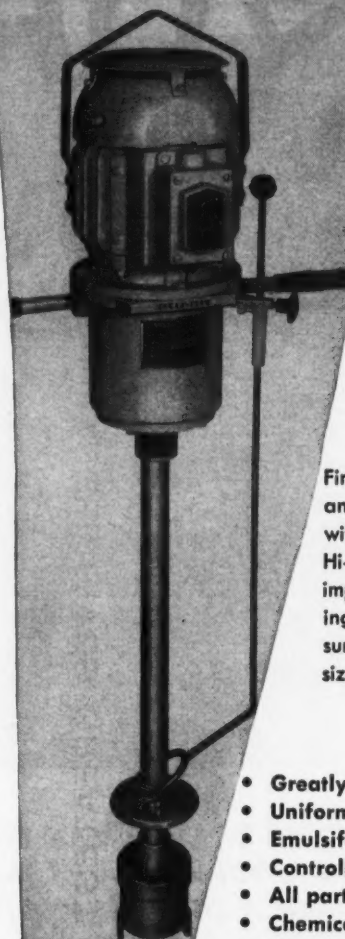
Another strip at one dryer's steam-trap discharge showed weight loss of 0.0550 grams and corrosion rate of 1.4 mg/dm²/day (0.0025" penetration/yr) during this same period of time.

(Hagafilm is product of Hagan Chemicals & Controls, Inc., Route 60 at Campbell Run Road, Box 1346, Pittsburgh 30, Pennsylvania.)

Check 2667 opposite last page.

SHEAR-FLOW

the
modern
mixer
with
power
shearing



Finer, faster blending, dispersing and homogenizing is now possible with Shear-Flow's new Model RL Hi-Shear Head. Finely spaced dual impellers induce considerable shearing action and high pumping pressures that rapidly reduce particle size for superior material mixtures.

- Greatly reduces mixing time
- Uniform circulation—no vortex
- Emulsifies immiscible liquids
- Controllable flow pattern
- All parts stainless steel
- Chemically inert seals
- Handles viscous materials with ease
- No operating Torque
- Disperses, blends, homogenizes

SHEAR-FLOW



GABB SPECIAL PRODUCTS INC.
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- ☐ Have representative call for demonstration
☐ Send more information

Name _____

Position _____

Co. & Address _____

Check 2668 opposite last page

DEHYDRATES

DAVISON SILICA GEL GIVES GREATEST PROTECTION

One cubic inch of Davison Silica Gel has an adsorptive surface of 90,000 square feet—an area larger than two city blocks! This capacity has made Davison Silica Gel the favored desiccant for air and gas dehydration and wherever rust, corrosion, or other moisture problems exist. For instance, Davison desiccants are used to protect tropical shipments, to clean and dehydrate air and natural gas—refrigeration sys-

tems—blast furnace gases—and in oxygen plants. Perhaps the application of a Davison desiccant to *your* moisture problems is in order. Write Department 3737 or call today for complete information.

W.R. GRACE & CO.
DAVISON CHEMICAL DIVISION
BALTIMORE 3, MARYLAND



Check 2669 opposite last page

NEW SOLUTIONS

Safe, efficient hand pumps simplify solvent handling at Visking Company

Problem: Withdrawing solvents from 55-gallon drums was often a back-breaking and messy job at the Chicago, Illinois, plant of Visking Company, Division of Union Carbide Corporation. Numerous drums of a wide variety of flammable and non-flammable solvents are stocked in the plant's solvent storage vault. Small quantities of material are constantly needed for different uses.

If not cradled on a drum rack, the heavy, bulky drums would have to be wrestled with in order to be spigotted and tilted before solvent could be withdrawn. When not closed



CP Staff Photo

High-vacuum hand pump is safe, delivers about 20 gallons per 100 strokes of handle

properly, spigots would leak, spotting the floor and causing potential fire hazard.

Solution: Hand-operated, liquid transfer pumps were installed on the drums. Ruggedly constructed, the low-cost units fit easily into bung holes and will pump almost anything that pours. Shovel-type handle is cadmium-plated, easy to operate, and delivers on both forward and back strokes. As a safety precaution, pumps are equipped with grounding wire to guard against static electricity.

Depending upon liquid being handled, pumps can be furnished with either molded synthetic or leather diaphragms. Units develop enough vacuum to pump against 20-ft head. Low temperatures, ice, dirt, or scale do

NEW SOLUTIONS

not affect pumps. There are no close-fitted moving parts to wear out.

Shaft and valve assembly are made of stainless steel. Housing is constructed of die-cast aluminum alloy, protected inside and out against corrosion. Suction screen in pump filters out any foreign particles that may be present in the fluid. Screen is removable for cleaning. Pumps are also fitted with return drip pans.

Results: Withdrawing solvents from drums is now a neat and simple job. Although individual units could be used to pump different solvents, Visking prefers not to do this. A specific pump is only for a specific solvent. This prevents contamination and eliminates necessity of cleaning between solvents.

Pumps are self-priming and deliver about 20 gallons per 100 strokes of handle. Maintenance on units is negligible. If servicing is required, no special tools are necessary. Installation (or removal) takes only a few minutes.

Pumps can also be adapted for use on tanks. Sliding suction tube can be quickly adjusted to proper depth.

(No. 688 series high-vacuum hand pumps are manufactured by General Products Division, Tokheim Corporation, Fort Wayne 1, Indiana.)

Check 2670 opposite last page.

Uning permits packaging of paint color tints in squeeze bottle

Problem: Swelling and collapse seemed to rule out use of polyethylene squeeze bottles for Rockcote Paint Co.'s new line of Pro-Tint colors in oil. In fact, two firms conducting tests for the Rockford, Ill., firm told them the on-the-job paint tints could never be packaged in plastic.

Loss of the aliphatic hydrocarbon solvent through the plastic bottle was a problem, too. But the main trouble was swelling and collapse caused by the polyethylene property of absorbing the solvent in vehicle of the composition.

Solution: Unwilling to give

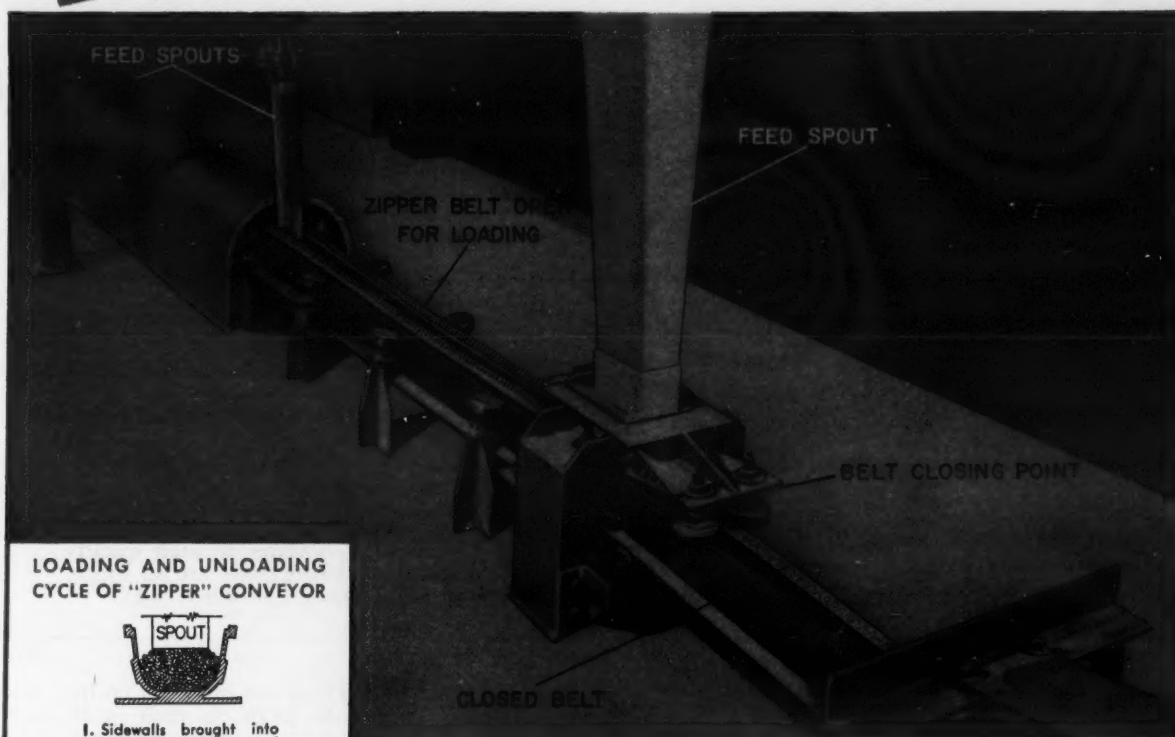
STEPHENS-ADAMSON

EXCLUSIVE

"ZIPPER"*

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CONVEYOR-ELEVATORS



LOADING AND UNLOADING CYCLE OF "ZIPPER" CONVEYOR



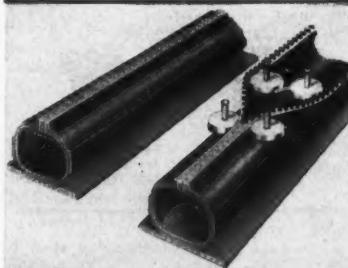
1. Sidewalls brought into vertical position and ready for loading.



2. Flexible tube completely closed for conveying and elevating.



3. Rubber ZIPPER belt open for discharge, cleaning and return run.



Upper left unit closed and loaded. Lower right shows how belt is opened and closed by system of ball bearing rollers. (Rollers are mounted on a rigid framework)

CONVEYS AND ELEVATES BY CONTINUALLY WRAPPING MATERIAL IN A PACKAGE...MOVING THE PACKAGE AND ITS CONTENTS TO A NEW LOCATION AND GENTLY UNWRAPPING IT!

Literally a moving material-carrying conduit, the ZIPPER Conveyor is capable of transporting bulk materials in any plane, to considerable heights and around obstructions. Its great advantage is that bulk materials may be conveyed within the belt completely sealed and dust-tight. Material doesn't slide, isn't scooped, pushed or thrown but is gently carried over great distances without breakage, agitation or segregation. The ZIPPER Conveyor-Elevator provides versatility of layout and profitable material handling advantages you won't want to overlook.

*PATENTED

WRITE FOR BULLETIN 349



**ENGINEERING DIVISION
STEPHENS-ADAMSON MFG. CO.**

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PLANTS LOCATED IN: LOS ANGELES, CAL. • CLARKSDALE, MISS. • BELLEVILLE, ONTARIO

Check 2671 opposite last page

Steam trap dependability is a matter of what the manufacturer puts into the trap

ARMSTRONG TRAPS ARE DESIGNED AND MADE TO GIVE YOU DEPENDABILITY

1. Efficient, proved operating principle



Armstrong Traps provide the most advanced development of the time-proven inverted bucket principle. Simple, but effective, there isn't much that can go wrong.

2. Good design



Armstrong Trap design gives big capacity in a small package. The mechanism is virtually fool-proof. All body styles are easy to inspect and maintain without removal from the line.

3. Highest quality materials of construction



Only the best goes into Armstrong Traps. Bodies are close grained 30,000 tensile iron castings or high quality forgings. Working parts are all tough, corrosion resistant stainless steel.

4. Good workmanship



Armstrong Traps are made by craftsmen who take pride in their work. Careful inspection and frequent checking insure the quality of the trap.

5. Application know-how



Your problem has probably been solved already in the extensive experience of the Armstrong engineering and sales organization. You can be sure of sound, dependable recommendations.

Your local Armstrong Representative can show you what Armstrong dependability can do for you. Call him today or write direct.



860 Series for low pressure heating service.



800 Series, side inlet, side outlet.



No. 801, side inlet, bottom outlet.



880 Series, integral strainer.



200 Series, bottom inlet, top outlet.



Forged Steel Series for high pressures, high temperatures.



The 48 page Armstrong Steam Trap Book tells how to correctly size, install and maintain steam traps for any pressure, any temperature, any load plus full catalog data on Armstrong Steam Traps. Ask for Catalog K.



ARMSTRONG MACHINE WORKS

8801 Maple Street Three Rivers, Michigan

NEW SOLUTIONS

up the novelty, attractiveness, and convenience of the squeeze bottle, Rockcote investigated further. Then the idea of using a lined polyethylene bottle was advanced.

The job of developing such a lining was turned over to Plax Corporation. That company devised a modified-epoxy lining that turned the trick.

Final design of the lined bottle has a special plastic top for added convenience to the



Lined polyethylene squeeze bottle dispenses tint in drops or (with top off) in large stream

user. The two-way cap has a spout small enough to deliver colorant in drops; for larger quantities, entire cap is unscrewed and removed. This top eliminates contamination, minimizes skinning and drying out, and makes leaking or spilling practically impossible.

Results: Lined bottle greatly minimizes migration, practically eliminates swelling that would cause undesirable collapse.

Estimated weight loss per year from a 4-oz Boston Round lined bottle (when it contains solvent alone) is only 2.1% at 120°F — versus 76.1% for a similar unlined bottle. Tests show that even at 73°F the unlined bottle would show a 7.4% weight loss per year. (Percent weight loss from bottle containing the Pro-Tint colors is, of course, lower than these figures.)

(More information on lined polyethylene bottles can be obtained from Plax Corporation, P.O. Box 1019, Hartford, Connecticut.)

Check 2673 opposite last page.

Check 2672 opposite last page



Although commercial polyurethane vehicles tailored specifically for paint industry are relatively new, their unusual properties have captured the imagination of formulators. Choice of end-product properties is expanded by these . . .

Versatile Polyurethanes: More Members for a Useful Family

Polyurethane vehicles for industrial finishes provide qualities of chemical resistance, toughness, weathering, and adhesion that are difficult to duplicate. Bidding to increase versatility of this class of coatings is a recently introduced experimental series of developmental vehicles and prepolymers.

Falling into three main categories, materials permit a broad range of end product characteristics.

One-can Vehicles

In the first category is a fast-drying vegetable oil/diisocyanate copolymer polyurethane coating material (XP 1197). This one-can stable product is cured by addition of 0.01% cobalt. It remains stable after incorporation of drier and is easily pigmented because it is not sensitive to moisture.

Typical Analysis

Acid value	0.5
Color (Gardner)	6
Viscosity	Z1-Z3
Solids, %	50 ± 1
Solvent	xytol
Isocyanate, %	0.0
Specific gravity	0.9638

Coatings based on this vehicle are extremely fast drying (see table) and have an early film hardness. In tests conducted in a twin arc weatherometer, film exhibited durability after 500 hr exposure comparable to commercially available urethane vehicles.

Second category has two entries (XP 1180; XP 1227),

both stable, one-can polyurethane prepolymer vehicles prepared from a mixture of di and tri-functional polyglycols. They are prepolymers because they contain terminal isocyanate groups; one-can systems because they are capable of conversion to cured films in presence of atmospheric moisture without addition of catalyst.

Typical Analysis

	XP 1180	XP 1227
Nonvolatile, %	50	50
Solvent	xytol/cellosolve acetate	
Viscosity (Gardner-Holt)	A	E
Color, Gardner	2	2
Sp gr 15/15°C	1.03	1.05
Available NCO, %	4.84	4.62

Preliminary studies of these two vehicles indicate that while XP 1180 dries faster and considerably harder than XP 1227 (see table), latter's films have greater flexibility. Both systems have good shelf-life stability, a light initial color, exhibit hard, positive dry and cure, and high gloss.

Catalyzed Vehicles

Third category contains a group of three experimental polyurethane prepolymers which can be set up by means of a catalyst, heat, or pressure, or a combination of all three. They can also be further reacted with polyhydroxy-containing materials to produce a variety of end products.

First of group XP 1078 (at 100% solids) has found use as an adhesive, protective coating, and as a potting and encapsulating material.

Second member, XP 1079 (XP 1078 in toluene, 90% solids), has been used as a bonding agent for wood, plastics, glass, paper, cloth, urethane and vinyl foams, and metal. Polyhydroxy compounds can be introduced to vary properties of resulting bond over a wide range.

Third member, XP 1088 (XP 1078 in toluene, 50% solids), has excellent film chemical resistance and versatile drying properties.

COMPARISON OF FILM PROPERTIES

	XP 1197	XP 1180	XP 1227
Drying			
Set	2 min	1 hr	6 hr
Through	10 min	10 hr	19 hr
Hard	15 min	19 hr	>24 hr
Sward Hardness			
1 day	16	18	0
3 days	26	58	12
1 week	40	64	12
1 month	45	64	12
Resistance* to:			
Alkali	F-G	E	E
Mineral acid	E	E	F-G
Oxidizing acid	G	F-G	F
Aliphatic solvent	E	E	E
Aromatic solvent	F	E	F-G
Alcohol	F	F	F
Weatherometer:			
On wood	E	F	P
On metal	G	E	P

*E—excellent; G—good; F—fair; P—poor

Spot Test Results for Chemical Resistance

Corrosive	Film condition (7 days exposure)
10% NaOH	no effect
10% NCl	no effect
10% HNO ₃	discolored/ very soft
1/2% HAc	soft
H ₂ O	soft
1/2% Tide	soft
Mineral spirits	no effect
Xylol	very soft
50% Ethyl alcohol	very soft

*Drying times on film: Set — 3/4 hr; Dry hard 2 hr. Sward hardness results: 1 day — 35; 3 days — 36; 1 week — 36.

Catalyst levels from 0.5 to 4.0% are recommended for all three of these prepolymers. Higher amounts of catalyst produce faster-drying film but decrease pot life. Varying catalyst level has little effect on final film properties.

(For more information on XP 1197, 1180, 1227, 1078, 1079, and 1088 contact Spencer Kellogg and Sons, Inc., Buffalo 5, New York.)

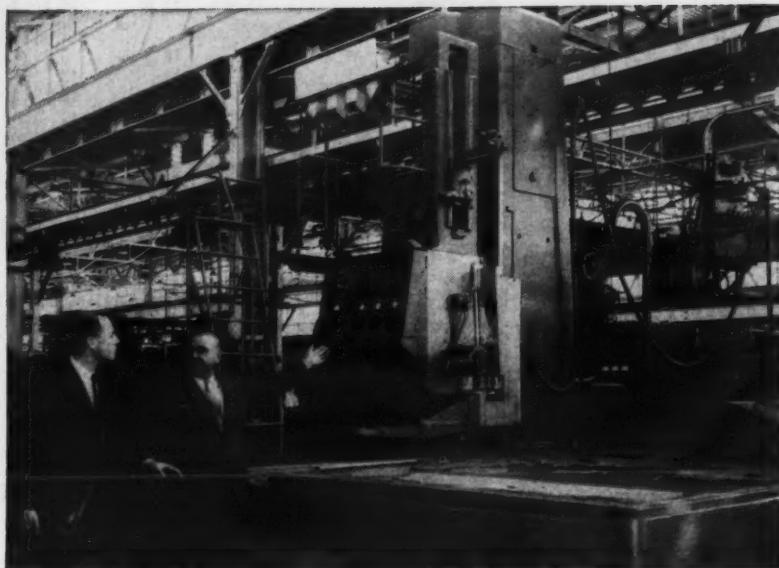
Check 2674 opposite last page.

COMPARISON OF FLOOR FINISH PROPERTIES

VEHICLE	SET	DRY TIME (hr)		SWARD HARDNESS			RESISTANCE TO 10% NaOH	TABER* ABRASION INDEX OF WEAR
		TACK FREE	HARD	1 DAY	3 DAY	1 WEEK		
Oil base polyurethane (Spenkel F77)	3/4	3	6	8	13	22	Fail-1 day	22
Oil base polyurethane (XP 1197)	5 min	12 min	20 min	16	26	40	Fail-3-7 day	10
Glycol base polyurethane (XP 1180)	1	10	19	18	58	64	OK 7 day	15
Styrene/butadiene base	1/4	1 1/2	4	5	13	14	Fail 3-7 day	54

*Milligrams weight loss/1000 cycles CS-17 wheel with 1000 mg weight. Lower number indicates less wear.

HOW **HERCULES** HELPS...

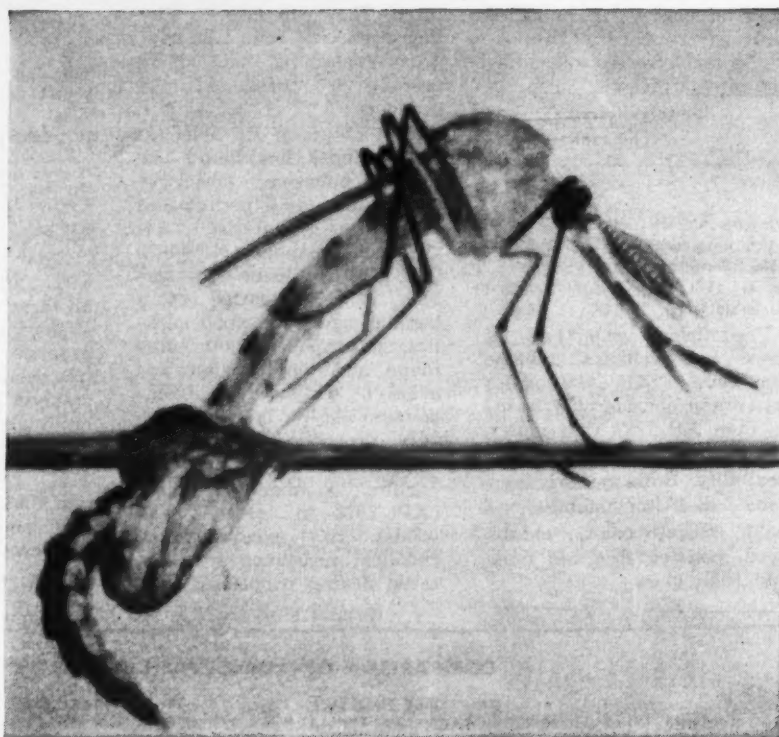


PROTECT HEAVY EQUIPMENT...

This giant Pratt & Whitney die cutter is typical of many applications for Parlon® based chlorinated rubber paints. Parlon finishes dry quickly, are economical to use, and provide a durable coating. Parlon based paint for this application supplied by The Egyptian Lacquer Co.

CONTROL INSECT PESTS...

This dramatic unretouched microphotograph shows a mosquito emerging from the pupa stage. Today this pest and his many companions are no longer the threat to human health and comfort that they once were. Insecticides based on Hercules' materials such as toxaphene and Thanite® (Hercules isobornyl thiocyanacetate) are sudden death to such insects. In addition, meta-Delphene (Hercules diethyltoluamide) is the base for leading repellents which help to make outdoor summertime activities more enjoyable.



HERCULES POWDER COMPANY

INCORPORATED

900 Market Street, Wilmington 99, Delaware

CHEMICAL MATERIALS FOR INDUSTRY



CHEMICAL MATERIALS

Producing fatty quaternary ammonium compounds commercially

Commercial quantities of fatty quaternary ammonium compounds are now being offered by Archer-Daniels-Midland. Principal one in series is dimethyl dihydrogenated tallow, a straight-chain, nonsymmetrical quaternary ammonium chloride salt. It is representative of the type of quaternary having two fatty alkyl and two methyl groups which is used as a home laundry softener.

Other quaternaries soon to be added to company's commercial line have application in textile and laundry industries as fluffing or softening agents, detergents, anti-statics, sanitizers, and dyeing aids.

Effective bactericides, they are used in antiseptic solutions, hair rinses, after-shave lotions, deodorants, mouth washes, algicides. They are also used as corrosion inhibitors, emulsifiers, viscosity stabilizers, and wetting agents.

(Details on compounds may be obtained from Archer-Daniels-Midland Company, 700 Investors Bldg., Minneapolis 2, Minn.)

Check 2676 opposite last page.

Histidine monohydrochloride

... occurs as small colorless crystals which are nearly odorless and possess salty taste. Solution of product is acid to litmus.

One gram of histidine monohydrochloride dissolves in 8 ml of water. It is insoluble in alcohol, ether, and chloroform. It yields not less than 98% nor more than 101.2% of $C_6H_9N_3O_2 \cdot HCl$, calculated to anhydrous basis.

(L-histidine monohydrochloride, N.F.X. is product of Central Research Laboratories, General Mills, Inc., 2010 E. Hennepin Ave., Minneapolis 13, Minn.)

Check 2677 opposite last page.

HERCULES

Check 2675 opposite last page

CHEMICAL MATERIALS

Soda content lowered in hydrated alumina

Uses: Catalyst-base applications and other uses requiring low-soda product.

Features: Product has low soda level. Typical level is said to be 0.40% Na_2O .

Description: Hydrated alumina has particle size distribution satisfactory for pelletizing. Physical properties are as follows:

Content, %:	
SiO_2	0.005
Fe_2O_3	0.003
Na_2O	0.04
Moisture (110°C)	0.02
Bulk density, lb/cu ft:	
Loose	75
Packed	90
Sieve analysis (on 100 mesh), trace	1%

(Hydrated alumina XC-35 is product of Aluminum Company of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.)

Check 2678 opposite last page.

Epoxy resin stretched 100% without breaking

Uses: Adhesive applications where changes in temperature tend to weaken bonds.

Features: In standard stretch or elongation tests at room temperature, a casting of resin doubled its length before breaking.

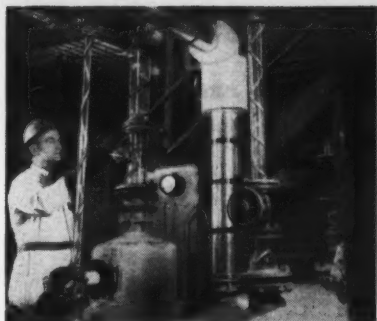
Description: Physical properties of the liquid epoxy resin are as follows:

Viscosity at 25°C (cps)	750-800
Color (Gardner)	10-11
Epoxide equivalent, grams	320-345

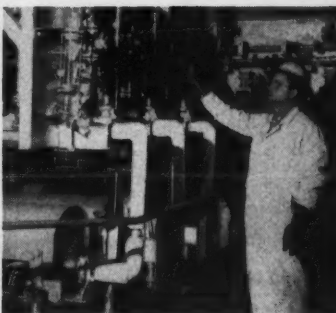
Resin can be cured with conventional aliphatic or aromatic polyamines or acid anhydrides. Low liquid-stage viscosity makes resin useful in solventless surface coatings. This also permits deep penetration in electrical-system encapsulation.

(Epon X-81 is product of Plastics and Resins Division, Shell Chemical Corporation, 50 W. 50th St., New York 20, New York.)

Check 2679 opposite last page.



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Check 2680 opposite last page

Another new development using

B.F. Goodrich Chemical *raw materials*



New automatic dishwasher-dryers manufactured by Waste King Corporation, have a tough, resilient, and colorful lining formulated by Michigan Chrome & Chemical Company, Detroit. B.F. Goodrich Chemical Company supplies the Geon polyvinyl material.

B.F. Goodrich

GEON polyvinyl materials • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

Check 2681 opposite last page

Here's the Inside Story...

dishwashers wear a coat of Geon

The tub, door lining, and racks of this new dishwasher are coated with a soft, resilient, and colorful Geon polyvinyl material. It treats housewives—and their dishes—more kindly than ever before. Yet it is tough and abrasion resistant—tests show it will outlast other coatings by two to three times.

The lining acts as an extra barrier to heat, moisture and sound. It will not crack, chip or peel—or become tacky or embrittled. It resists corrosion and stands up well to heat, light and aging. If damage should occur, the coating can be repaired quickly and easily by servicemen in the field.

Geon polyvinyl materials are being used for many kinds of coating applications—from metal and glass, to paper and textiles. Geon is a versatile material and is available in many forms for servicing many industries. Rigid vinyl pipe, electrical insulation, house siding and coated steel paneling are only a very few of the many products Geon serves so well. For help on your product idea, write Dept. AL-5, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company

CHEMICAL MATERIALS

Strong epoxy systems produced by anhydride

Uses: Intermediate for preparing surface-active agents, lubricant additives, corrosion inhibitors, dyes, fungicides, and inks. As curing agent, suitable for systems used in impregnating, potting, casting, and similar applications.

Features: Testing indicates that epoxy systems cured with anhydride possess high compressive and flexural strength, low power-factor characteristics, and low shrinkage. Low exotherm evidenced by product in casting operations is conducive to plant safety.

Description: Dimethyl substituted butenyl tetrahydro phthalic anhydride has combination of double-bond and anhydride functionality.

(Beta-S is product of Market Development Department, Heyden Newport Chemical Corporation, 342 Madison Ave., New York 17, N. Y.)

Check 2682 opposite last page.

Crop variation is ceased in reconstituted bergamot

Uses: Aerosol, cosmetic, and soap applications.

Features: Crop variations have been eliminated.

Description: Reconstituted bergamot oil is said to be first essential oil ever to be successfully produced entirely by chemical synthesis in commercially available quantities. Properties of oils are as follows:

Specific gravity (@ 25/25°C)	0.880
Ester content, %	43.9
Evaporation residue, %	4.7

(F. B. reconstituted oil bergamot is product of Fritzsche Brothers, Inc., 76 Ninth Ave., New York 11, N. Y.)

Check 2683 opposite last page.

Solid plasticizers' roles in adhesives, lacquers, foams, films, and rigid plastic compositions is detailed in Solid Plasticizer Booklet—Organic Chemicals Division, Monsanto Chemical Company, 800 N. Lindbergh Blvd., St. Louis 66, Mo.

Check 2684 opposite last page.

CHEMICAL PROCESSING

**Permanent fire resistance
for urethane foams**

Uses: Urethane-foam production.

Features: Resins produce urethane foams with permanent high-level fire resistance.

Description: Polyester resins are used in quantities up to 60 lb/pour (low density) and as much as 120 lb/pour (high density) in Hobart mixers.

Systems permit good control with mixing and pouring cycle of 10 to 15 minutes. One-shot foams require heat curing at 200 to 250°F for approximately one hour.

(Hetrofoam resins are product of Hooker Chemical Corporation, Box 344, Niagara Falls, New York.)

Check 2685 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

**Gelling-reaction time
is predetermined**

Uses: Gelling of solutions containing variety of materials such as clay, charcoal, sawdust, and cement-sand mixtures.

Features: Agent will form gel in controllable length of time after addition of a catalyst.

Description: Gelling agent, in dry-white-powder form, dissolves in water to form non-viscous solution. This will gel in any time period up to 24 hours, depending upon catalyst system used. Time can be controlled within $\pm 10\%$.

With catalyst alteration, product can gel solutions of ethylene glycol, glycerine, sulfuric acid, and other electrolytes.

(Cyanogum 41 gelling agent is product of Industrial Chemicals Division, American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y.)

Check 2686 opposite last page.

TOWER PACKING

All the facts about HARSHAW *tellerettes*

Contained in this comprehensive booklet discussing the application of Harshaw Tellerettes to tower packing.

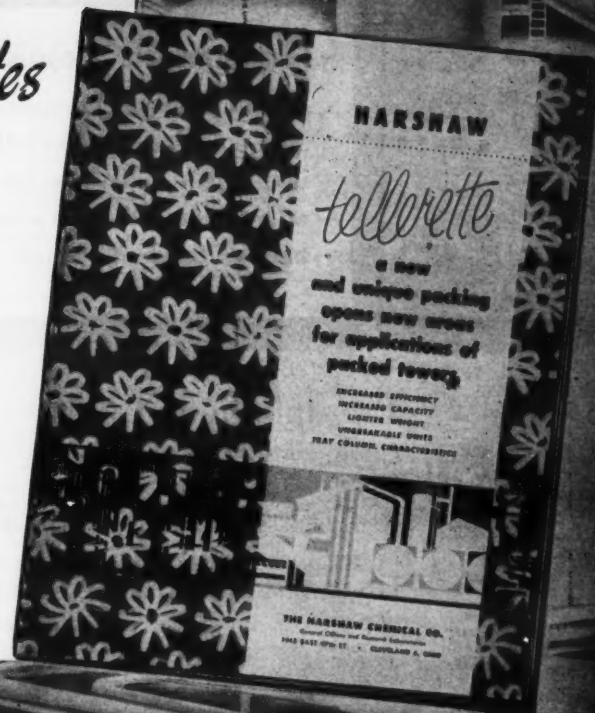
Subjects discussed at length (accompanied by pertinent charts)

1. The Tellerette Shape
2. Physical Characteristics
3. Lower Capital Investment and Operating Cost
4. Low Weight
5. Reduced Tower Height
6. Increased Tower Capacity
7. Support Plates
8. Corrosion Resistance
9. No Clogging

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nonionic surfactants

Foam Stabilizers — Solubilizers — Detergency Boosters — Emulsifiers

Emulphogene BC nonionic surfactants are alkylpoly(ethyleneoxy)ethanols that differ from one another in ethylene oxide content. By using the appropriate product, or by mixing them, various degrees of hydrophilic-hydrophobic balance can be obtained.

*Highest Degree
Water Solubility*

Emulphogene BC-840

LIQUID MANUAL-DISHWASHING FORMULATIONS

Highly effective, economical foam stabilizer for alkylarylsulfonates; most efficient solubilizer. Increases detergency, aids in grease emulsification.

*Soluble in water
and water-miscible
solvents*

Emulphogene BC-720

Equally effective as BC-840 in liquid manual-dishwashing formulations, but easier to handle because it is liquid at room temperature and less viscous.

*More
Water Soluble
than BC-420
Oil Dispersible*

Emulphogene BC-610

IN PULP AND PAPER MANUFACTURE

More effective than soap or alkylaryl-sulfonates in the deresination of sulfite pulps.

NEUTRAL WOOL SCOURING

Excellent scouring agent at relatively low temperatures. Makes wool run better on cards and combs.

*Insoluble in water,
soluble or dispersible
in petroleum
based solvents*

Emulphogene BC-420

Intermediate for high-foaming anionic surfactants. Excellent emulsifier for white oil, kerosene, and other petroleum fractions.

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Emulphogene BC surfactants manufactured by General Aniline & Film Corp. are sold outside the United States and Canada under the tradename "Mulgofen BC" by distributors all over the world.

Check 2688 opposite last page

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Growing Market Is Seen For Phosphoric Acid as Fertilizer Raw Material

In a recent article in Farm Chemicals Magazine, Lawrence Byck—U.S.I. Manager of Heavy Chemical Sales—discusses the value of wet-process phosphoric acid as an agricultural chemical raw material. Phosphatic Fertilizer Solution (PFS) has been an intermediate in triple superphosphate production for many years, but its use as a raw material for fertilizer generally dates back only to 1957.

According to Mr. Byck, the usefulness of PFS depends on these factors:

- (1) It is the only commercial source of P_2O_5 in liquid form. Dusting and massive solids handling problems are eliminated.
- (2) It is by far the most highly acid source of P_2O_5 commercially available.
- (3) It is the most concentrated commercial source of P_2O_5 —52-54%.
- (4) It may or may not be a markedly economical source of P_2O_5 , depending on consumer location.

Given these factors, says Mr. Byck, here are some of the things PFS can do for the mixed fertilizer industry:

- Neutralize large quantities of ammonia, because of high

MORE

New Commercial Route to Copper Strip Starts with Ammonia Leaching of Scrap

Copper strip can now be made commercially from a powder which is derived from copper scrap by chemical means. Scrap is leached with ammonia, and reduced to copper powder with hydrogen gas at 375° F and 1,200 psi.

Via a specially developed process and related equipment, the powder is roll-compacted into strip that is sintered at 50-100° F below its m.p. under a hydrogen atmosphere. The strip is then rolled and annealed to specification.

Sodium Addition Improves Properties of Alloy

Recent tests have indicated that metallic sodium, added in small quantities to aluminum 356, improves ductility and the already fine mechanical properties of this casting alloy. As little as 0.02 to 0.04% seems to do the job. Above about 0.04%, additional sodium causes fluidity loss and increased porosity, with an accompanying loss of mechanical properties.

Aluminum 356, used extensively in industrial, aircraft and missile service, contains about 7% silicon and 0.3% magnesium. The silicon crystals are large and needle-shaped, which tends to make the structure relatively brittle. Sodium refines the crystals to a small, finely dispersed form to improve alloy properties.

In the tests, sodium bricks were added by immersing them in the molten alloy wrapped in aluminum foil. The foil gradually melts and allows the sodium below the surface of the molten alloy, to do its work.

Missiles and Rockets, Fast Growing Market for Chemical Materials and Research

Propellents, Lubricants, Plastics, Nonferrous Metals Among Materials Researched, Developed and Supplied by the CPI.

It is estimated that more than 25% of the \$4-billion-plus government expenditure for missiles and rockets, in the fiscal year just ending, went to the chemical industry for materials, research and development. For the fiscal year starting July 1, total government expenditures for this program are expected to be about 30% greater, with the chemical industry's share possibly even higher than in 1958-1959. The U. S. space and weapons program is becoming a larger and larger factor to chemical manufacturers.

Structural Materials Largest Market

Where does the CPI fit into this vast undertaking? Structural materials are of course the greatest contribution in terms of tonnage and of dollars. Practical materials must be found to withstand temperatures as high as 7,000° F. Strength must be high. Weight must be kept down. The chemical industry is working on answers—evaluating nonferrous metals and alloys, ceramics, organic and inorganic polymers, graphites—developing new compounds, new techniques, new combinations.

Nonferrous Metals Used or Proposed For Structures in Missiles & Rockets

Aluminum	Nickel
Beryllium	Silver
Cadmium	Tantalum
Chromium	Tin
Cobalt	Titanium
Columbium	Tungsten
Copper	Zinc
Magnesium	Zirconium
Molybdenum	

Non-Metal Materials Used or Proposed For Structures in Missiles & Rockets

Alkyls	Aluminum Oxide
Epoxies	Glass
Fluorocarbons	Graphite
Phenolics	Nickel Molybdate
Polyamides	Silicon Carbide Cpds.
Polybutadienes	Thorium Oxide
Polyesters	Zirconium Boride
Polysulfides	Zirconium Oxide
Silicones	Other Ceramic Oxides
Urethanes	

Along with combinations of metals and ceramics (ceramets), researchers have recently proposed metal-ceramic-plastic "alloys" which, if practical, might make the ideal rocket materials.

Propellents Greatest R&D Challenge

Propellent procurement is rather small since, of course, propellents are actually used only during firings. But the research effort

in this area is enormous. The reason: none of the materials evaluated to date completely answer the requirements of the ideal propellent.

Liquid systems, on the one hand, are complex, and many of the component materials have the disadvantages of corrosiveness, toxicity, low density and, for ballistic purposes, poor storage life. However, liquids are relatively easy to control and, most important, have high specific impulse.

Solid systems, on the other hand, present problems of their own. Combustion control is difficult. Component materials need better physical properties such as flexibility and thermal expansion coefficients. Most important, they are low in specific impulse compared to liquids. But solid systems are reliable, comparatively simple equipment-wise, and can be fired easily on short notice.

In consequence, both types of systems are under intensive investigation, but with the emphasis on solid systems growing.

MORE

Liquid Propellent Materials, Used or Under Consideration

FUELS	OXIDIZERS
Alcohols	Chlorine Trifluoride
Alkyl Boranes	Fluorine
Amines	Hydrogen Peroxide
Aniline	Liquid Oxygen
Ammonia	Nitric Acid
Cyanogen	Nitrogen Tetroxide
Hydrazine	Oxides of Nitrogen
Hydrogen	Other
Hydrogen Cyanide	Oxygen Difluoride
Kerosene	Oxygen Fluoride
Unsymmetrical	Ozone
Dimethyl	MONOPROPELLENTS
Hydrazine (UDMH)	Ethylene Oxide
	Hydrogen Peroxide

Solid Propellent Materials, Used or Under Consideration

FUELS	Polyethylenes
Boron Based	Polyurethanes
Compounds Contain-	Polysulfide Rubbers
ing Metals Like	OXIDIZERS
Aluminum	Ammonium Nitrate
Beryllium	Potassium Nitrate
Magnesium	Ammonium
Resins such as	Perchlorate
Acrylics	Potassium
Butadiene Vinyl	Perchlorate
Pyridine	Lithium
Celluloses	Perchlorate
Epoxies	DOUBLE BASED
Phenolics	Nitrocellulose
Polyamides	Nitroglycerine
Polyesters	

U.S.I. CHEMICAL NEWS

CONTINUED Missiles

Many Other Types of Materials Needed

The chemical industry also supplies to the missile field materials such as lubricants, hydraulic fluids, pressurizing gases, and plastics and rubbers for seals and gaskets and protective clothing. Of particular interest is the research work in progress on synthetic lubricants to supplement the mineral-based varieties. Among the compounds under investigation are included fluorine derivatives, diester derivatives, phosphorus-boron combinations, tin-silicon compounds, silicones and alkyl silanes.

U.S.I. Contributes in Several Areas

Because of its diversified interests in chemicals, plastics and nonferrous metals, U.S.I. contributes to the vital space and weapons program both directly and indirectly. Through 1/2 ownership of Mallory-Sharon Metals, U.S.I. supplies zirconium, titanium in commercial quantities, tantalum and columbium in pilot quantities. Polyethylene, made by U.S.I., is among the resins under investigation in solid propellant fuels. Another U.S.I. product, ISOSEBACIC® acid, may be used as an intermediate for the polyurethanes studied for the same purpose, as well as for diester bases in synthetic lubricants. U.S.I. makes ethyl alcohol, long used in liquid propellant systems. AFN, Inc., 25% owned by U.S.I., has a government research contract on boron-based fuels. And in a joint venture with Food Machinery, dimethylhydrazine-type fuels are being studied.

CONTINUED Phosphoric

acidity—an important advantage.

- Allow formulation of high-analysis grades—a strong trend in the industry—because of high concentration.

- Granular goods are growing in popularity. PFS formulations generally give more rugged granules—better suited to subsequent handling—without adding granulation aids.

In summation Mr. Byck notes that because of transportation costs, PFS will probably be uneconomical in many areas. But in many more of the important agricultural areas, it is becoming the product of choice for reasons of product quality, overall costs and adaptability to process needs.

Faster Analysis Developed For Halogens in Organics

A researcher at the Texas Agricultural Experiment Station has worked out an improved method of the quantitative determination of halogens in organic materials. It is said to be faster, cheaper than previous techniques.

In a typical analysis, the chemist would weigh a sample containing about one milliequivalent of chlorine into a beaker, add excess ammonia to dissolve and chill the sample, and ethyl ether to insure that the sample stays in solution. Chlorine is then reduced to chloride with about half a gram of metallic sodium. Appearance of a blue color indicates complete reduction, which takes only about two minutes.

Ammonia and ether are evaporated, excess sodium combines with water vapor to yield sodium hydroxide, and the blue color disappears. Nitric acid is used for neutralization, and the chloride is titrated with silver nitrate.

As little as ten minutes of the chemist's full attention is devoted to a single analysis, and several analyses can be conducted simultaneously. Error is rarely higher than 3%.

New Extraction Process Purifies Many Elements

A new extraction process for purifying a large number of elements, including many not usually subject to extraction processes, is described in USP 2,874,176 issued recently. By this technique, elements can be separated selectively from an aqueous solution containing a mixture of elements.

Here is how it works. The various elements in the solution are reacted with an alkali metal salt of perfluorocarboxylic acid. From the resulting compounds in solution, the desired compound is selectively extracted with a substantially immiscible polar organic solvent such as an alcohol, ether, ketone or phosphate.

Extraction is reported to depend on a number of variables: chain length of acid, valence of cation, organic solvent, molar ratio of cation to reagent, ion size, complexing ability of cation and pH. For example, uranyl and vanadyl ions extract together at pH 2, but at pH 1.65, only uranyl ion extracts.

After separation of the desired element, the reactions can be easily reversed so that the element is once more in aqueous phase and the reagents are recovered.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Identification reagent for synthetic fibers, as well as for animal and vegetable fibers, can now be obtained. Claimed to give reliable identification in minutes by imparting distinct colors to different fibers. **No. 1480**

New economical corrosion inhibitor for aqueous recirculating systems combines sodium molybdate with orthophosphate. Combination claimed to be synergistic—effective as the molybdate alone but at greatly lowered cost. **No. 1481**

Automatic recording titrator now on market is designed to make variable and constant pH measurements automatically. Simultaneously provides permanent record. Titrant delivery rate and chart speed are both variable. **No. 1482**

Corrosion and spotting preventive for all metals, recently developed, is added to hot water rinses. Said to promote spot-free drying, and to leave an invisible film which protects against tarnish and corrosion for months. **No. 1483**

Volume I of new series of publications on advances in inorganic and radiochemistry can now be purchased. 448-page book contains sections on boron hydrides, lattice energies, activation analysis, phosphonitrilic halides, etc. **No. 1484**

Commercially-pure titanium anode hooks and baskets, designed to meet need for high corrosion resistance in nickel and chrome plating operations, are now on market. Said to have indefinite life in highly corrosive mixtures. **No. 1485**

Selective reductions of organic compounds with complex metal hydrides are discussed in new brochure now available. This review of published literature covers types of reactions possible, includes bibliography. **No. 1486**

Polyethylene aspirator pump now on market cannot corrode; said to perform as capably as metal aspirators, operate efficiently on all water pressures from 11 pounds up. Recommended for highly corrosive filtrates. **No. 1487**

Physical and thermodynamic properties of many commonly-used elements and compounds are covered in new brochure offered by catalyst maker, to aid in catalyst selection when factors of equilibrium, heat exchange, etc. are vital. **No. 1488**

Thorium technology is discussed in series of papers now bound in 397-page volume and offered for sale. Topics include melting, refining, structure, properties, fabrication, corrosion, production of compounds. **No. 1489**

PRODUCTS OF U.S.I.

Alcohols: Ethyl (pure and all specially denatured formulas); Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

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Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodium Sulfate.

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without chilling**

Uses: Applications in pharmaceutical vehicles, paper and textile finishes and coatings, and enzyme stabilization.

Features: Product forms gel rapidly without need of chilling.

Description: Thiolated protein is white powder in dry state. Stable gelatin contains approximately 20 sulfhydryl groups per molecule with molecular weight taken as 100,000.

When 2% or more of protein is dissolved in water, and suitable oxidizing agent is added, heat-stable gel forms at room temperature within two minutes. Gel will not dissolve in boiling water.

(Thiogel-20 is product of Schwarz Laboratories, Inc., 230 Washington St., Mount Vernon, N. Y.)

Check 2689 opposite last page.

**Epoxidized soybean oil
stabilizes vinyl resins**

Uses: As plasticizing stabilizers for vinyl resins.

Features: Product provides good heat stability.

Description: Vinyl-resin plasticizing stabilizers are manufactured from pure soybean oil. Epoxidized soybean oil is available in both regular and premium grades.

(EpoxyGen is product of Central Research Laboratories, General Mills, Inc., 2010 E. Hennepin Ave., Minneapolis 13, Minnesota.)

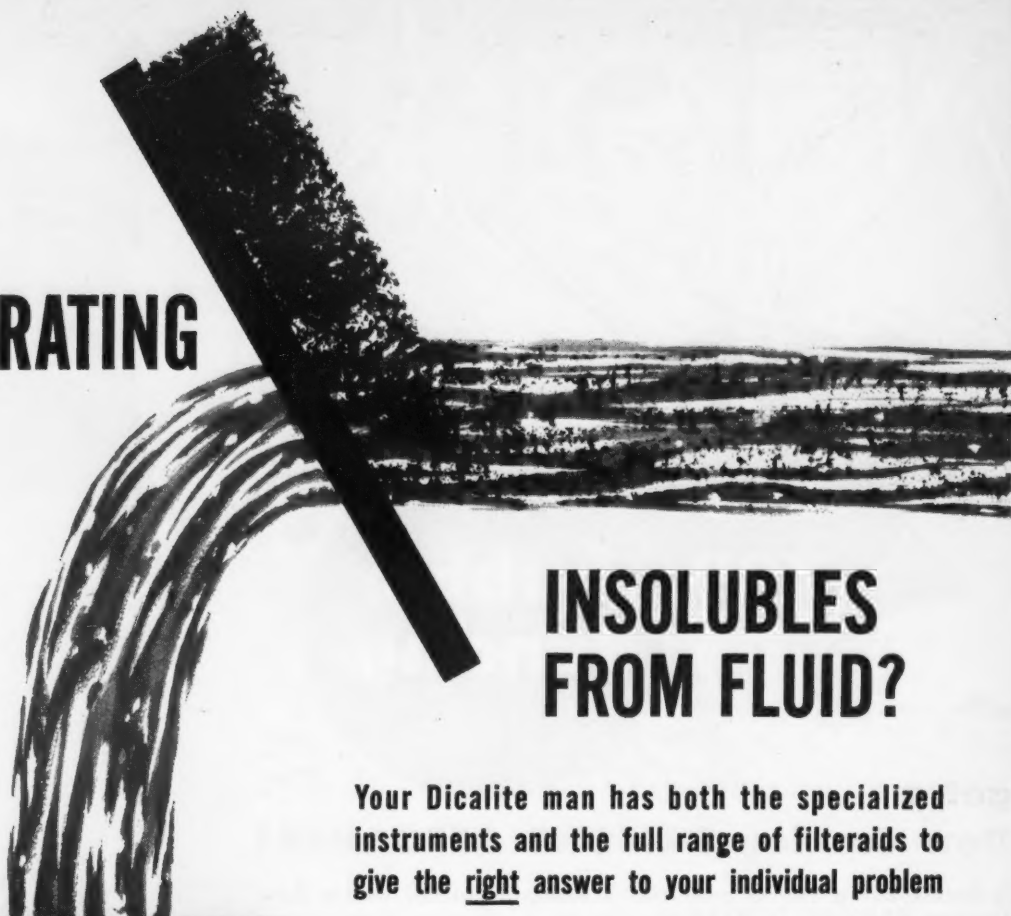
Check 2690 opposite last page.

Butyl rubber is presented in 12-page catalog, incorporating application listing and charts and graphs illustrating various characteristics. "Butyl Rubber" — Enjay Company, Inc., 15 W. 51st St., New York 19, N.Y.

Check 2691 opposite last page.

For more information on product at left, specify 2692 . . . see information request blank opposite last page.

SEPARATING



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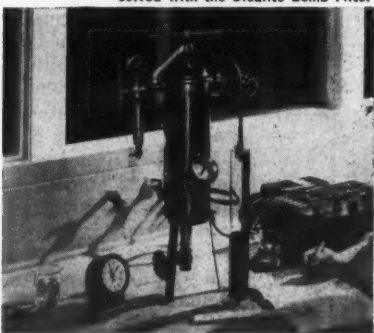
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A problem in pressure filtration being solved with the Dicalite Bomb Filter

Check 2693 opposite last page



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CITY _____ ZONE _____ STATE _____		Food products _____	
		Other _____	

Check 2694 opposite last page

CHEMICAL MATERIALS



Industrial New Products Marketing Manager, C. E. Ford, here helps demonstrate graphite cloth's thermal resistance. Torch flame (insert) that melts stainless steel leaves graphite cloth unharmed

Graphite, long a standard in processing equipment where high chemical and thermal resistance are required, now is available in a form that promises to extend its use potential many-fold

Graphite cloth— flexible form of familiar material

Uses: Graphite in flexible form holds promise as a reinforcing agent for various plastics and refractory materials used at high temperatures, or where thermal cycling is required. It is a potentially useful raw material for bag type filters for hot non-oxidizing gases; for equipment to handle corrosive fluids; for electrostatic precipitators.

Combining thermal properties with self-lubricity, graphite cloth could be used in valve packing and gasketing for high-temperature seals.

Features: Not merely cloth impregnated or treated with graphite, product is 99.9% pure graphite in flexible form. It combines high thermal and chemical resistance of manufactured graphite, with flexibility of a woven textile.

Graphite textiles are resist-

ant to attack by acids, alkalis, and organic compounds, except for those of a highly oxidizing nature. It oxidizes in air at temperatures in excess of 750°F and is unaffected by liquid nitrogen at a temperature of -320°F. There is no melting point at ordinary pressures, material sublimates at approximately 6600°F.

Description: Graphite textiles are made by graphitizing a fiber or fabric, such as rayon. Any textile form — yarns, braids, felts, or fabrics that are woven or knit — can be processed. Thermo-chemical conversion occurs at a temperature approaching 5400°F.

A typical example is a cloth of square weave, 28 by 28 construction, being made in 40-inch width up to 7 ft long. Average thickness is 0.024 inches. Initial price of experimental quantities of this particular weave is \$1.50/sq ft.

Tensile strength actually

Some Typical Properties

Surface area, sq ft/sq ft	260
Weight, lb/sq ft	0.04
Tensile strength (room temp)	
lb/in width	10 to 15
Electrical resistance (room temp)	
ohms/in width/in length	1/2

increases with increasing temperature. At 4500°F it is about twice that at room temperature.

(Graphite textiles are a development of National Carbon Company, Div. of Union Carbide Corporation, 30 E. 42nd St., New York 17, N. Y.)

Check 2695 opposite last page.

Elastomer is slated for 400°F service

Uses: Seal and liner applications.

Features: Elastomer is designed for use at 400°F. It chemically resists such fluids as diester, silicate ester, and petroleum-based lubricants, and hydraulic fluids.

Description: Highly fluorinated synthetic elastomer is not combustible due to high fluorine content. Test results indicate that material undergoes no change in physical properties following one year of outdoor exposure in industrial atmosphere.

Also, it does not crack after 200 hours of exposure to ozone at 150 ppm by bent-loop method. Material is available in 1-, 5-, and 10-lb units.

(Fluorel is product of Chemical Division, Minnesota Mining and Manufacturing Co., 900 Bush St., St. Paul 6, Minnesota.)

Check 2696 opposite last page.

Internal vinyl pigmentation is considered in three single-sheet bulletins. Various applications are included in Buls 50, 495, and 496 — Claremont Pigment Dispersion Corp., 39 Powerhouse Rd., Roslyn Heights, Long Island, N. Y.

Check 2697 opposite last page.



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Check 2700 opposite last page

CHEMICAL MATERIALS

**Polyester resin modified
by styrene monomer
for 500°F service**

Indefinite laminate operation at 350 to 450°F

Uses: Reinforced plastic applications.

Features: Resin may be modified with various monomers to achieve performance capability in range of 350 to 700°F. When modified with styrene monomer, laminates are produced which will operate indefinitely at 350 to 450°F. Such laminates will withstand, with high physicals, 500°F for intermittent periods of time.

Description: Polyester resin is 100% polymer. B-stageable properties of resin may be utilized through modification with diallyl phthalate or diallyl isophthalate monomers. Physical properties of resin as modified with styrene monomer are as follows:

Barcol hardness	50
Specific gravity	1.27
Flexural strength, psi	20,000
Compressive strength, psi	18,000

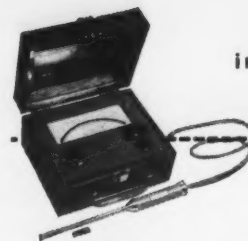
(Polyester resins AR-1075 and AR-2076 are products of Chemical Materials Department, Chemical and Metallurgical Division, General Electric Company, 1211 N. Olive St., Anaheim, Calif.)

Check 2701 opposite last page.

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MEASURES
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This precision-made instrument can quickly save you many times its modest price through elimination of lost time, errors in design and loss of control.

Write for Bulletin 913
Illinois Testing Laboratories, Inc., Room 304, 420 N. LaSalle St.,
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Check 2702 opposite last page

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MANGANOUS OXIDE
MONOHYDRATED
MANGANESE SULFATE

Check 2704 opposite last page

CHEMICAL MATERIALS

Close sphericity control ups alumina quality

Uses: Adsorbent agent for drying wide variety of gases, liquids, and vapors. Also as catalyst carrier in many processes.

Features: Closely controlled sphericity of product results in minimum pressure drop. Spheres possess high abrasion resistance and capacity for repeated regeneration.

Description: Active alumina is manufactured by controlled calcination of beta trihydrate. Principle constituents are eta alumina and alpha monohydrate. Final product does not contain chi and gamma aluminas. Material is available in sphere-size diameters of $\frac{1}{8}$ to $\frac{1}{2}$ ".

(Active alumina is product of Kaiser Chemicals Division, Kaiser Aluminum & Chemical Corporation, 1924 Broadway, Oakland 12, Calif.)

Check 2705 opposite last page.

Thermoplastic elastomer — strong when elongated

Uses: Material can be used in solution or to deposit films which, when dry, have vulcanized-material properties. Present major application is jacketing wire and cable.

Features: Polyurethane material has high tensile strength at high ultimate elongation.

Description: Thermoplastic polymer has form of rubbery, clear amber granules. They are converted into end products by milling, calendaring, extrusion, or molding. Material has 550% extensibility.

(Estane VC is product of B.F. Goodrich Chemical Company, 3135 Euclid Ave., Cleveland 15, Ohio.)

Check 2706 opposite last page.

Tertiary phosphines are treated in six-page bulletin, which discusses in detail the preparation and reactions of these compounds. Organic Chemical Bul. Vol. 31, No. 1—Eastman Organic Chemicals Dept., Distillation Products Industries, Division of Eastman Kodak Company, Rochester 3, N. Y.

Check 2707 opposite last page.



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These "New Solution" stories appear in the "New Solutions" section which begins on page 28 of this issue.

This type of story is featured in other sections throughout the magazine.

They are case history stories that state the operating problem, explain how it was solved, and describe the results obtained.

"New Solution" stories cover all important phases of your operations — processing, safety, maintenance, material handling, packaging corrosion, to name a few.

For more information on product at left, circle 2710 see information request blank opposite last page.



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Check 2711 opposite last page

CHEMICAL MATERIALS

Butyl rubber is cured without catalysts

Uses: Curing of butyl rubber.

Features: Curing with resin does not necessitate use of catalyst. Utilization of this resin as curing agent permits production of butyl rubber parts reportedly capable of withstanding exposure to 500°F for extended periods, without losing resiliency.

Description: Bromo-methyl alkylated phenol-formaldehyde resin makes possible curing of butyl rubber in 10 to 60-minute cycles at temperatures of 300 to 350°F. Typical physical properties of resin are as follows:

Specific gravity	1.06
Melting point (capillary), °F	124
Moisture content, %	0.12
Ash, %	0.025

(SP-1055 resin is product of Schenectady Varnish Co., Inc., Schenectady 1, N. Y.)

Check 2712 opposite last page.

No solvents or diluents to shrink adhesive

Uses: Cementing plastics, cast iron, steel, and other metals and surfaces to themselves or each other.

Features: Adhesives are made up of 100% solids, with no solvent or diluent present. This precludes shrinkage.

Description: Thermosetting adhesives produce bond which is water-insoluble and resists most acids, alkalies, and other chemicals. Both rigid-bond (401) and flexible-bond (402) types are available. Both varieties cure at room temperature.


(Cepox 401 and 402 are products of Chemical Development Corporation, Danvers, Mass.)

Check 2713 opposite last page.

Thermoplastics are reviewed in six-page brochure which includes selector guide and properties chart. Form W-200 — Alphalux Division, Westlake Plastics Co., Lenni Mills, Pa.

Check 2714 opposite last page.

KNOX Tower Packings



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Firm _____

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BASIC TO
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For specifications and local offices, see our insert in Chemical Materials Catalog, pages 435-442, and in Chemical Week Buyers Guide, pages 35-42.

NITROGEN DIVISION

Dept. NF 2-6-1 40 Rector St., New York 6, N. Y.

2819

Check 2716 opposite last page

WHEN FURNACE ATMOSPHERES MUST BE DESERT-DRY...

Your gas generator manufacturer is quite likely to include a Lectordryer when a dry controlled atmosphere is required. In this way he assures the constant dryness so necessary in many metallurgical furnace operations. Lectordryers are long on engineering — have the built-in extra capacity that always seems to be needed. That's why they may cost somewhat more in the beginning, but cost considerably less in the long run. Ask your gas generator builder for advice on dry controlled atmospheres. For other drying help, write Pittsburgh Lectordryer Division, McGraw-Edison Company, 352 32nd Street, Pittsburgh 30, Pennsylvania.



Lectordryer®

Check 2717 opposite last page

CHEMICAL MATERIALS 1958-1959

To complete the listing, of developmental chemical materials* introduced during the past year, here is an addendum containing information received too late for inclusion in the June issue.

Carboxymethyl Cellulose — Selectacel-CM, solid. Isolation, purification of proteins. Low degree of substitution.

Cellulose — Selectacel-ECTEOLA, solid. Isolation, purification of proteins. Reacted with epichlorohydrin and triethanolamine.

Diethylaminoethyl Cellulose — Selectacel-DEAE, solid. Isolation and purification of proteins.

(Further information on above items may be obtained by contacting Brown Company, Berlin, N.H.)

Check 2718 opposite last page.

Calcined Clay — Glomax, solid. Paint and plastics.

Organic Surface Modified Clay — REA-7, REA-15, and REA-45; solid. Paint, plastics, and organic systems.

(Further information on above items may be obtained by contacting Georgia Kaolin Co., 433 N. Broad St., Elizabeth, N.J.)

Check 2719 opposite last page.

Polyethylene — Dylan 3014, solid. Bottles. Intermediate stiffness.

Polyethylene — Dylan WPD-230A, solid. Film. Intermediate film resin.

Polyethylene — Super Dylan, dispersion. Protective coating for metals.

Polystyrene — Dylene KPD-590, solid. Extruded lighting panels, molded closures. Medium-medium impact, heat resistant type.

Polystyrene — Dylene KPD-600, solid. Incandescent light fixtures. Heat-resistant type.

* Available in one pound samples from manufacturers.

Polystyrene — Dylene KPD-635, solid. Hot-drink cups. High-impact type.

Polystyrene — Dylene KPD-673, solid. Detergent caps. Medium-medium impact.

Styrene Butadiene Latex — Dylex K-31, dispersion. Paint. High pigment bonding.

Styrene Butadiene Latex — Dylex K-85, dispersion. Gloss coatings on paper.

Styrene Butadiene Latex — Dylex KCD-142, dispersion. Textile backings and finishes. High bonding strength without need of vulcanization.

(Further information on above items may be obtained by contacting Plastics Division, Koppers Company, Inc., Koppers Bldg., Pittsburgh 19, Pennsylvania.)

Check 2720 opposite last page.

Acrylic Copolymer Emulsions — Synthemul Emulsions, liquid (40% solids). Leather finishing agents. Impart toughness and surface gloss to leather.

Epoxy Resin — Epotuf 6150, liquid. Applications requiring 100% reactive epoxy.

Epoxy-resin Hardener (catalytic type) — Epotuf Hardener EH-27, liquid. Potting small electrical components. Sets epoxies in one minute at room temperature.

Epoxy-resin Hardener (polyamine salt) — Epotuf Hardener 2609, liquid. Electrical potting.

Phenolic-film Glue (on cellulosic base) — SW-2000 Plyophen PGL, continuous roll. Lamination of wood beams. Precludes spreaders and veneer moisture.

Polyvinyl Acetate Emulsion — Plyamul 9155, liquid. Toughening concrete. Eliminates need to maintain damp conditions during cure.

(Further information on above items may be obtained by contacting Reichhold Chemicals, Inc., R C I Bldg., White Plains, N.Y.)

Check 2721 opposite last page.

Transition-metal Acetylacetonates — Electromet, solid. Combustion improvement of fuels, metal plating by vapor deposition. Soluble in organic systems.

Transition-metal Chlorides and Sub-chlorides — Electromet, solid or liquid. Production of metal powders and intermediates.

Transition-metal Oxides and Sub-oxides — Electromet, solid. Fillers and adsorbents. Fine particle size and non-stoichiometric ratios.

(Further information on above items may be obtained by contacting Union Carbide Metals Company, Division of Union Carbide Corporation, 30 E. 42nd St., New York 17, New York.)

Check 2722 opposite last page.

Vermiculite — Vermiculite Flake, solid. Provides fire resistant and intumescent effect in surface coatings. Strengthens binders.

Vermiculite — Vermiculite Gold Flake, solid. Plastics, paper, and filler in gold bronze. Color unaffected by temperatures up to 1700°F.

(Further information on above items may be obtained by contacting Zonolite Company, 135 S. La Salle St., Chicago 3, Illinois.)

Check 2723 opposite last page.

Urethane, rubber foams allied to utilize scrap

Uses: Bonding of foam rubber, polyurethane foam, or vinyl foam.

Features: Binder will bond both similar and mixed scrap, whether derived from natural or synthetic rubber, as well as scrap vinyl foam.

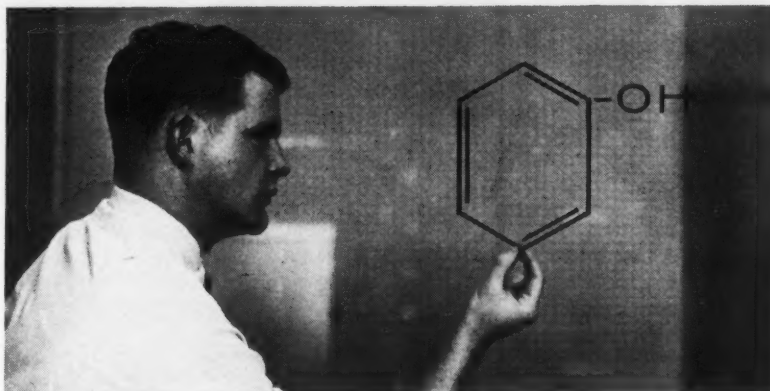
Description: Liquid polymer can be used to make flexible cork sheets by mixing with cork granules. Leather dust and chips can be blended with product to produce leather-like material.

Liquid rubber binder is available in all size containers, from pints to 55-gal drums. Product is non-flammable, self-vulcanizing, and heat resistant.

(Rubtex is product of Rubba, Inc., 1015 E. 173rd St., New York 60, N. Y.)

Check 2724 opposite last page.

BRIEFS



99.8% phenol at no extra cost

Now you can order shipments in large quantities of Hooker phenol that assays typically at 99.8% purity by bromination.

Another indicator of quality is this product's freezing point—a minimum 40.6°C.

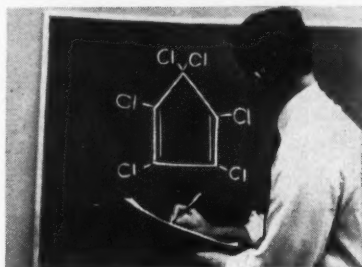
Its distillation range is only 2° from first point (180°C) to dryness.

Hooker phenol meets or exceeds all

requirements of U. S. Pharmacopoeia XV.

For more complete specifications and other data, send the coupon.

Bulletin on handling phenol. The Manufacturing Chemists Association has put out a Chemical Safety Data Sheet on phenol which we are offering as Hooker Bulletin 166. You can get a copy of this also by sending the coupon.



You might find a new product in this cyclopentadiene group

Take a look at those six active chlorines and the two double bonds.

They are an open invitation to the study of such derivatives as the acids, acid chlorides, acid anhydrides, esters, amides, ketones, di-ketones, quinones, acetals, nitriles, and fluorocarbons.

Many of these end products have already found markets as insecticides, germicides, fungicides, pharmaceuti-

cals, dyes, and non-flammable resins.

We think the story on C-56® (hexachlorocyclopentadiene) is just beginning—that the creative chemist will use this versatile chlorocarbon to develop many more profitable products.

If you can see something in C-56 for your research, send the coupon for more technical information. If you'd like a sample, too, write for it on your business letterhead.

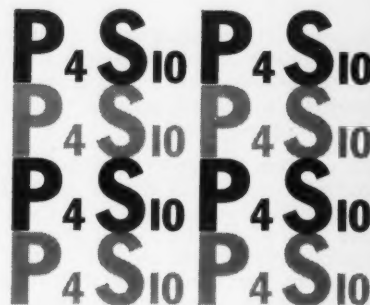
on a top quality phenol...a highly reactive, promising cyclopentadiene...the many ways to buy Oldbury® phosphorus pentasulfide

Many ways to buy phosphorus pentasulfide

Could one of the many forms of Oldbury® brand phosphorus pentasulfides help improve your product?

Are you color conscious about your product, for example? We make a special distilled grade (it sells at no extra cost) which is freer than standard P₄S₁₀ of the carbonaceous materials which can discolor a product.

Do you want a finer or a coarser powder? We offer three mesh sizes of both standard and distilled grades as well as solid in standard grade. The mesh sizes are 20, 6 and 2. For descriptive technical data sheets, check the coupon below.



If you're worried about ample supply at any time, mark the fact that we have two producing plants—one at Niagara Falls, N. Y. and one at Columbus, Mississippi.

We also make phosphorus heptasulfide and phosphorus sesquisulfide.

Complete data on all three are offered in the coupon.

For more information, check here and mail with your name, title, company and address.

- | | |
|--|--|
| <input type="checkbox"/> Handling Phenol, Bulletin 166 | <input type="checkbox"/> Phenol Data Sheet No. 811 |
| <input type="checkbox"/> Hexachlorocyclopentadiene, Data Sheet No. 815 | |
| <input type="checkbox"/> Phosphorus Pentasulfide, Data Sheet No. 801 | |
| <input type="checkbox"/> Phosphorus Heptasulfide, Data Sheet No. 798 | |
| <input type="checkbox"/> Phosphorus Sesquisulfide, Data Sheet No. 803 | |

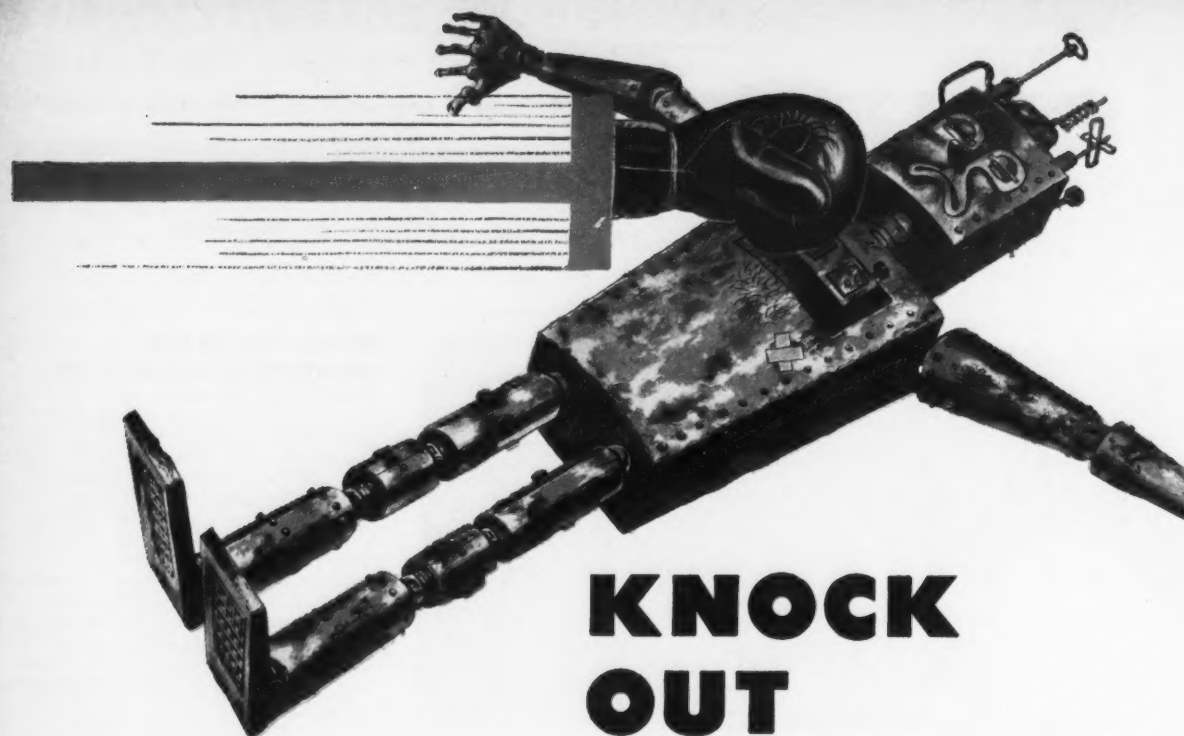
HOOKEER CHEMICAL CORPORATION

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Sales Offices: Chicago Detroit Los Angeles New York
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Check 2725 opposite last page



KNOCK OUT CORROSION WITH ALKATERGE-T

Alkaterge-T is fulfilling its early promise of being an exceptional oil-soluble corrosion inhibitor. It passed two commonly used screening tests with the most gratifying results and industrial users are finding confirmation in practice.

At least part of its success is probably due to its very powerful adhesion to metallic and other hydrophilic surfaces. The force required to break this adhesion has been measured at 10,500 psi — highest of any compound tested. Alkaterge-T is a big molecule and with this adhesion, powerful protection would be expected by most corrosion engineers. But Alkaterge-T has a plus value, too. Mildly alkaline, it will tie up any trace of acidity that may develop, yet it is harmless to brass. This product, therefore, should be evaluated by every manufacturer of rust preventive oils, lubricants, cutting oils, extruding oils, transformer oils, corrosion resistant greases, and spinning and throwing oils for the textile industry.

Alkaterge-T is a powerful emulsifying agent for water-in-oil emulsions and is unaffected by hard water. As little as 1% will emulsify 80% water into aliphatic hydrocarbons and form a fluid, stable emulsion. In lubricating formulations, Alkaterge-T tends to prevent sludge formation resulting from moisture pickup and should be of interest in crank case flushing oils and fuel oils. It should also be evaluated as a liquefier for

the water-in-oil sludges that present severe problems in automobile crankcases, fuel oil tanks and crude oil production.

For further information and samples, write Commercial Solvents Corporation today.

ALKATERGE-T TYPICAL PHYSICAL PROPERTIES

Color (melted), Gardner (1933)	12 max
Solidification Point, °C	59
Interfacial Tension against water, 0.1% solution in mineral oil	1.8 dynes/cm
Surface Tension, saturated aqueous solution	30.4 dynes/cm
Flash-Point	None
Solubility in water at 25 °C	0.01 ml/100 ml



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INDUSTRIAL CHEMICALS DEPARTMENT

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Check 2726 opposite last page

CHEMICAL MATERIALS

Commercial production, use of polyisoprene rubber

Polyisoprene rubber is going into commercial production and use for the first time. This event has taken form of truck tires from commercial polyisoprene rubber.

New compounding techniques and special process for synthetic have been developed. These shorten curing time, give material better adhesion, and adapt it to normal tire-building operations. Initially, polyisoprene truck tires are being produced in 7.50-20 size. Production of other types of tires is anticipated.

(Isoprene rubber is product of Shell Chemical Corp., 380 Madison Ave., New York 17, New York.)

Check 2727 opposite last page.

(Polyisoprene-rubber truck tires are product of United States Rubber Co., 10 Eagle St., Providence 1, R.I.)

Check 2728 opposite last page.

Linear acetal resins into production

Commercial production is beginning on two types of linear acetal resins or polyoxymethylenes. One (Delrin 500) is for general purpose molding. Second composition (Delrin 150) is for extrusion applications.

Thermoplastics have dense crystalline structures. They are tasteless, odorless, and non-toxic. Resins have potential uses in some areas presently incorporating die-cast metals.

(Delrin 150 and 500 are products of E. I. du Pont de Nemours & Co., Wilmington, Delaware.)

Check 2729 opposite last page.

Muriatic acid information, including drawings, tables, and graphs, along with properties, principal reactions, and uses, are thoroughly presented in 44-page manual, "Dow Muriatic Acid"—Inorganic Chemical Sales, The Dow Chemical Company, Midland, Michigan.

Check 2730 opposite last page.



IDEAS: from other industries and nuclear field
— new trends in research, processes, services

Using efficient suspension polymerization, modern Florida plant is capable of turning out 50 million pounds polyvinyl chloride per year. Coupling advanced know-how with rigid process control installation . . .

PRODUCES DUST-FREE PVC RESINS

AN improved process of suspension polymerization is being used to turn out dust-free polyvinyl chloride at Pace, Florida, on Escambia Bay about 20 miles from Pensacola. Owned by Escambia Chemical Corporation, New York City, the plant is geared to produce about 50 million pounds resin per year.

Ten vinyl resins are made, spanning a wide range of molecular weights. The dustless material, known as "PVC Pearls"®, are available in five molecular weight grades. Because of their exceptional processing characteristics, they are of particular interest to fabricators of vinyls.

Large Particle Size

The dust-free resins are characterized by their large (0.2 to 0.6 mm diam), uniform particle size. Completely free of fines, the materials maintain uniform bulk density, simplify handling, and minimize product loss. The rough, pitted surface of the particles gives them ability to absorb large amounts of plasticizer, while still maintaining their high heat stability and good blending and fabrication properties.

Escambia's polymerization process is the outcome of an intensive research and development effort. Rigid process control coupled with efficient processing reportedly results in polymeric products having top-notch physical properties.

Although exact details about the production process are kept under wraps, here is a general description of what goes on in the plant:

Vinyl chloride monomer is received in pressurized tank

cars. From storage tanks the monomer is transferred to an evaporator where the phenol inhibitor is removed by aqueous caustic. The purified monomer is then conveyed to glass-lined 3700-gal reactors where polymerization takes place.

Polymerization

Carefully demineralized water is used for suspending the vinyl monomer in the presence of a catalyst and other materials. The water is kept free of ionic materials and entrapped air.

Temperature during polymerization is rigidly controlled, refrigerated water being necessary to maintain a constant temperature as the reaction becomes vigorously exothermic. Polymerizations are usually conducted at 50°C, but higher temperatures may be used if it is desired to reduce catalyst level. There must be a judicious choice of temperature and catalyst amounts to produce resin of maximum quality.

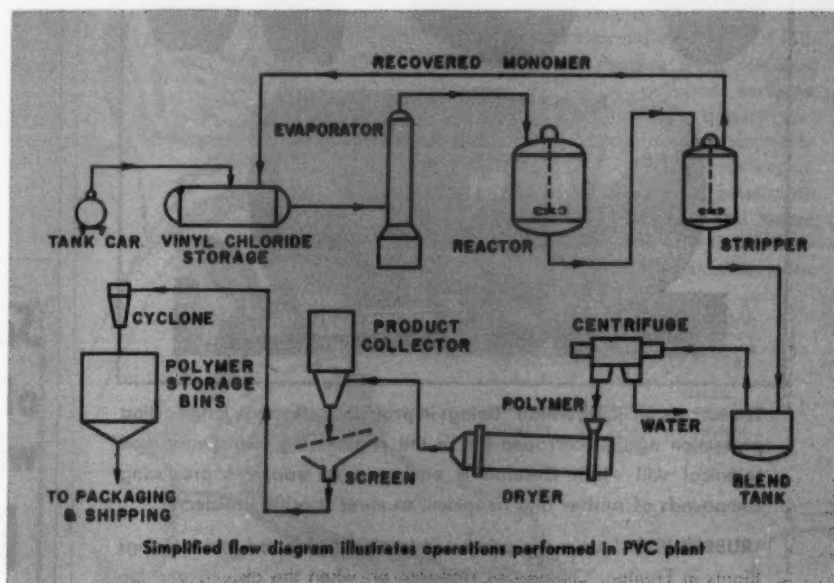
Type and speed of agitation are also critical factors. Some other variables influencing polymerization are selection and quantities of suspension agent used, effectiveness of heat transfer of the reactor, and choice of catalyst.

Polymerization Time

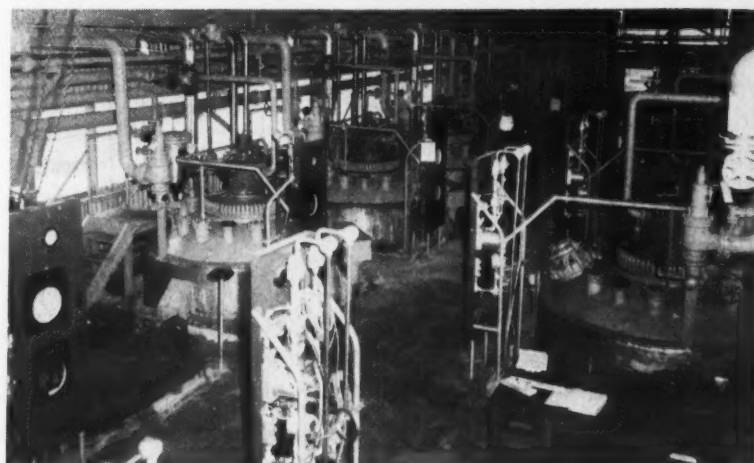
Because of these factors, polymerization times can vary widely. Most batches require 12 to 18 hours, although periods less and greater than this range are occasionally used.

After polymerization is complete, the slurry of PVC

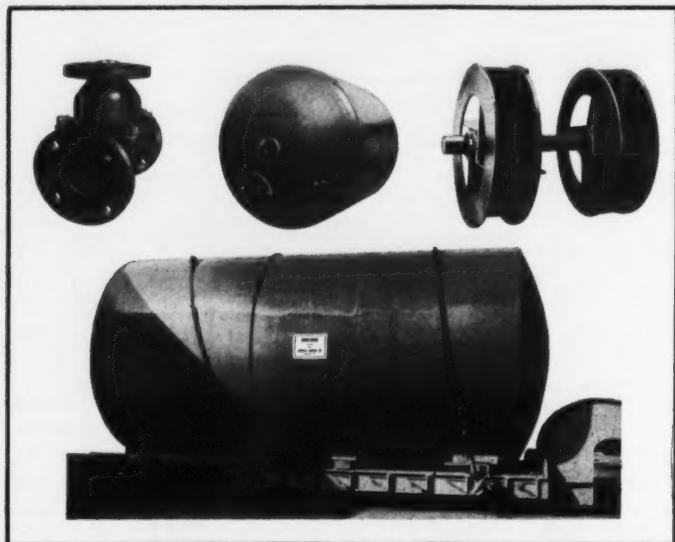
TED F. MEINHOLD, Associate Editor
with **W. MAYO SMITH**
Vice President and Director
Research and Development
Escambia Chemical Corporation



Polymerization is conducted in glass-lined 3700-gal reactors



IF CORROSION IS A PROBLEM, *Talk With* *Goodall Engineers About* "RUBBERHIDE"



The success of "Rubberhide" Linings in providing effective, long-lasting protection against corrosion lies in the engineering experience and technical skill which Goodall is equipped to apply in producing compounds of rubber and neoprene to meet specific problems.

"RUBBERHIDE" Linings are processed to objects shipped to our Linings Plants in Trenton, Chicago or Houston; or, when the objects are too large for such shipment, or the work involves fixed plant equipment, experienced field crews do the processing "on location".

Whether factory or field processed, "RUBBERHIDE" Linings will repay many times their cost through extended life of products, parts or equipment regardless of size, shape or service requirements.

"If it's GOODALL, it MUST be Good!"

Contact Our Nearest Branch for Complete Information
See Pages 348-349, Chemical Engineering Catalog

Standard of Quality—Since 1870



HOSE • BELTING • FOOTWEAR • CLOTHING
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GOODALL Rubber Company

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Check 2731 opposite last page

IDEAS

in water is dropped from the reactor into a stripper where the unreacted monomer is recovered. The slurry is then transferred to blend tanks. Polymer and water are next pumped to centrifuges where most of water is removed.

Resin travels to a rotary dryer where preheated air is passed through. Dried particles containing less than 0.5% moisture, are conveyed by air stream to product collector and thence to vibrating screen where proper size classification occurs. The resin then moves by air stream to a cyclone where the material is collected. Final product is gravity fed to storage bins, ready for weighing, packaging, and shipping.

(Further information about polyvinyl chloride resins may be obtained from Escambia Chemical Corporation, 261 Madison Ave., N.Y., N.Y.)

Check 2732 opposite last page.

Plasma thermocouple reactor offers hope for low-cost nuclear power

Test at Los Alamos proves feasibility of device

Plasma thermocouple reactors may be the answer to economic electric power from fission. Results of experiment conducted recently at Los Alamos scientific laboratory proves that direct conversion of nuclear reactor energy into electric power through use of a plasma thermocouple is feasible.

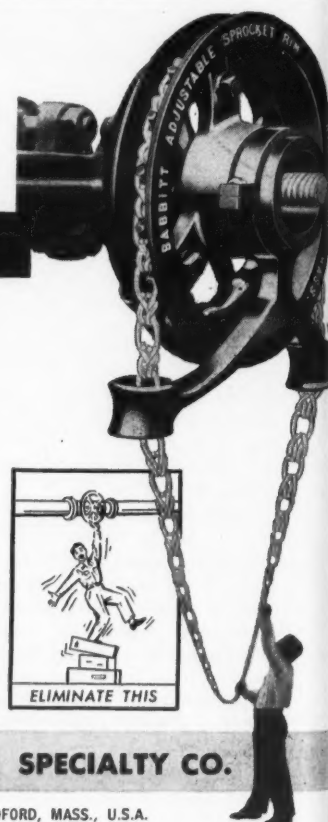
Calculated to produce only enough power to light an electric bulb for a few minutes, lifetime of the experimental device far exceeded all expectations. Acting like a superpowered flashlight battery—with an open circuit voltage of 3.8 volts and a short circuit current between 30 and 40 amps—the ther-

Safe Operation of Overhead Valves with a

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SPROCKET RIM
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14 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

Check 2733 opposite last page

CHEMICAL PROCESSING

mocouple was operated at design efficiency for almost 12 hours before it was shut down and dismantled for analysis.

The device resembled an empty frozen fruit juice can. Source of power was a $\frac{1}{4}$ " diam rod, about $\frac{3}{4}$ " long, containing enriched uranium. This was suspended in center of the cell and surrounded by cesium gas.

When assembly was lowered into core of a reactor, the neutron flux activated uranium fission heating in center of can, while flow of reactor coolant through jacket of can dropped temperature of cesium plasma. Essential requirements of a thermocouple were thus met, and electricity was produced.

When this single cell is extrapolated to an entire reactor, implications of a successful plasma thermocouple to future atomic energy developments are tremendous. The

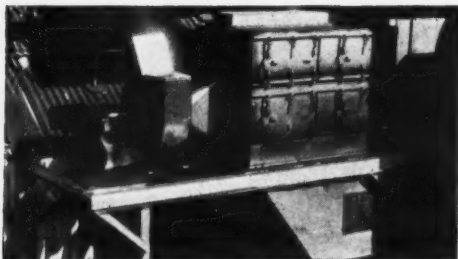
utter simplicity of the device — no moving parts, extreme low weight, small cost — virtually eliminates all but the plasma thermocouple reactor in the production of economic electric power from fission.

By-passing boilers, turbines, gas condensers, and dynamos may also open up new vistas in the fields of nuclear propulsion in both submarine and space travel.

(Information courtesy of Los Alamos scientific laboratory, operated by the University of California for the Atomic Energy Commission, Los Alamos, New Mexico.)

Custom-equipment manufacture is outlined in two-page bulletin. Iron and steel casting, machine work, and custom-plate fabrication are covered in Bul 708-1—Contract Manufacturing Division, Goslin-Birmingham Manufacturing Co., Inc., P.O. Box 631, Birmingham, Alabama.

Check 2734 opposite last page.



Barely visible discharge from exhauster in this unretouched photo shows how Dustex Miniature Cyclone Collector ended a problem for Perlite Products Co.—while recovering 70 lbs./hr. with no maintenance.

"95% PREDICTED EFFICIENCY PROVED ...

and Collector is maintenance-free!"

Frank W. Schaffer, President of Perlite* Products Co., Primos, Pa., writes this about his Dustex Miniature Cyclone Collector purchased on a basis of the Dustex Single Tube Determination test:

"Your predicted efficiencies of 95% are proven ...collecting 70 lbs./hr. of 85% below-325-mesh material at 450°F...complaints on discharge are ended, and the collector is maintenance-free."

*Perlite...extremely lightweight material for insulation and filtration, with a bulk density as low as 3.5 lbs./cu. ft.

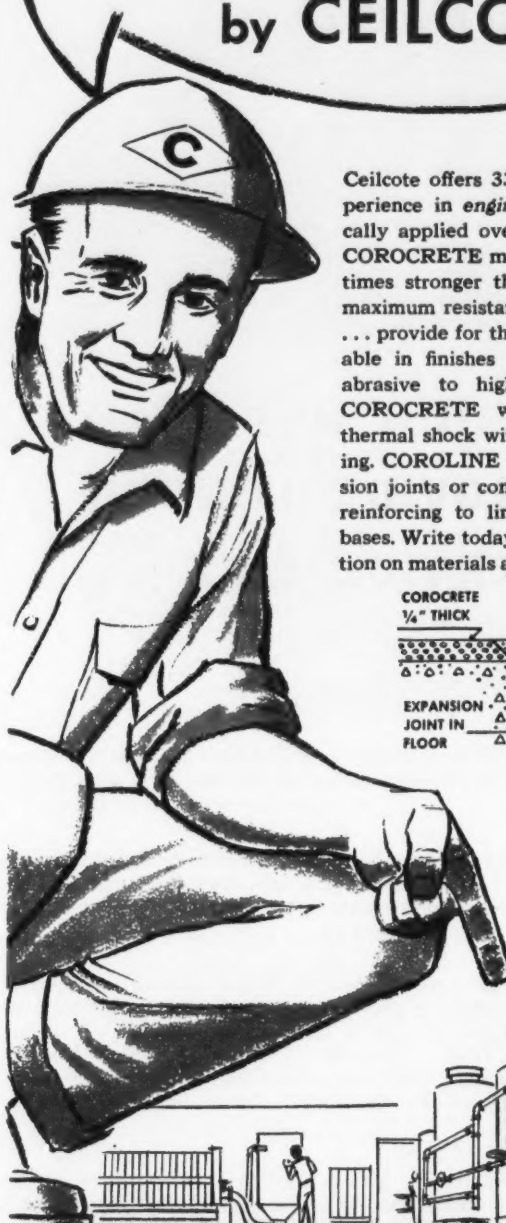
Write Today for Dustex Bulletin "A Simplified Test Method" describing actual collection test at your plant at no obligation.



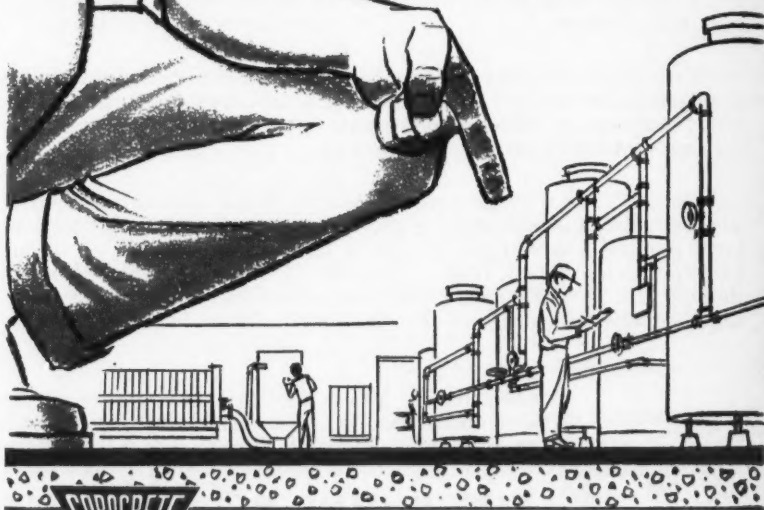
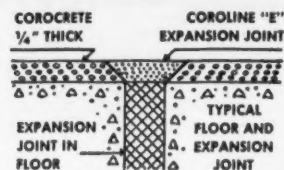
25 ANDERSON ROAD • BUFFALO 25, N.Y.

Check 2735 opposite last page

This CORROSION-PROOF FLOOR was pre-engineered by CEILCOTE!



Ceilcote offers 33 years of technical experience in *engineering* floors. Scientifically applied over new or old concrete, COROCRETE monolithic floors are four times stronger than concrete... offer maximum resistance to acids and alkalis... provide for thermal expansion. Available in finishes ranging from non-skid abrasive to highly polished surfaces, COROCRETE withstands impact and thermal shock without spalling or cracking. COROLINE is used to cover expansion joints or combined with glass cloth reinforcing to line trenches and pump bases. Write today for complete information on materials and installation services.



THE CEILCOTE COMPANY, INC.

4834 Ridge Road • Cleveland 9, Ohio

8994-OC

Check 2736 opposite last page

KUHNS

DUCTILE IRON PIPE FITTINGS*



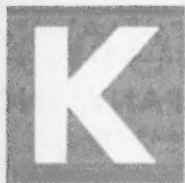
**CORROSION RESISTANT
TO PROVIDE LONGER
SERVICE LIFE**

If your biggest maintenance problem is downtime for replacing fittings, you'll be interested in the money saving advantages of Kuhn's Ductile Iron Pipe Fittings.

Their superior corrosion resistance, high strength and ability to withstand shock assure extra years of service, help reduce operating costs and simplify maintenance. Their smooth bore helps eliminate clogging, keeps systems working at maximum efficiency.

Wide Selection With a complete line of cast iron fittings and the newly developed ductile series, Kuhn's offers the *right* fitting for practically every purpose. Choose from all types of flanged fittings from 1½" through 12"; companion flanges from 1" through 12"; screwed fittings from ¼" through 12". Over 3000 sizes and shapes, available coated, galvanized or uncoated to meet your specific requirements. Write for full details.

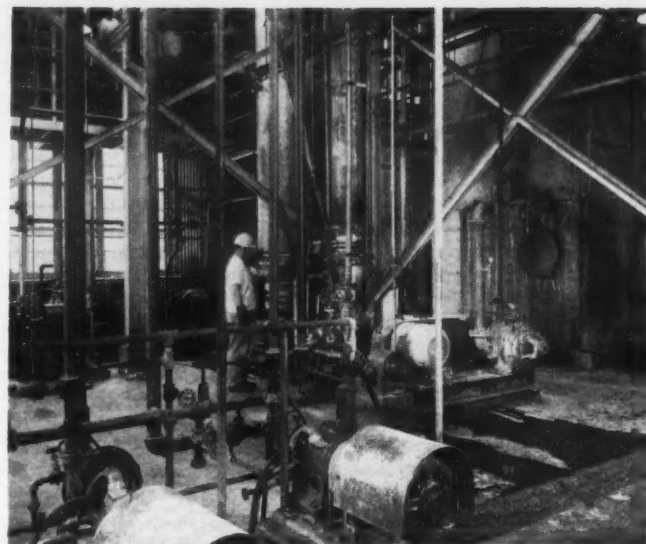
* Kuhn's ductile fittings are listed and pressure rated by the Underwriters' Laboratories, Inc. All Kuhn's fittings are available nationally through better wholesalers:



THE KUHN'S BROTHERS CO.
1800 McCALL STREET • DAYTON, OHIO

Check 2737 opposite last page

IDEAS



Marking another stride forward in the paper industry, while at the same time helping to solve problem of water pollution, new three-quarter million dollar experimental plant at Consolidated Water Power & Paper Company . . .

Recovers spent chemicals from sulfite mills

Use of sodium base sulfite pulping may soon be on the upswing in the pulp and paper industry, thanks to a new chemical recovery system. Now in commercial operation, on an experimental basis, the process is installed at the Consolidated Water Power & Paper Company's mill at Wisconsin Rapids, Wisconsin.

The plant cost more than three-quarter million dollars, can process liquor from 30 tons pulp per day. If successful, the new process may open new horizons in sulfite and semichemical pulping and help put sulfite pulping in a strong, competitive, economic position. It will also mark a big step forward in solving the water pollution problem plaguing the industry today.

Up to now, there has not been a reliable, practical, and

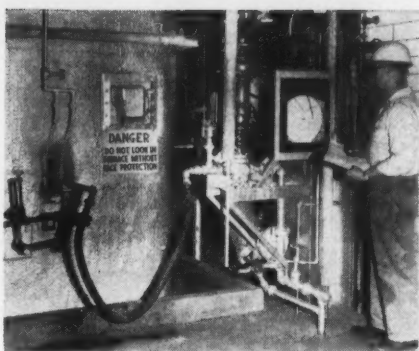
economic chemical recovery process available for sulfite pulping. Because of this, cost of chemicals has always been a serious process limitation. Previous attempts at sulfite recovery have also required need for expensive, specially-designed equipment to withstand the highly corrosive action of untreated spent sulfite liquor. The new system supposedly has also solved this problem.

Can Handle All Pulp Wastes

One of the major features of the recovery system is its ability to treat spent liquor from neutral sulfite semichemical, sodium acid sulfite, or even kraft pulp. It also permits intermixing of liquors, if desired. This makes it possible for a mill operating with

Experimental recovery plant at Wisconsin Rapids may open up new horizons for sodium base sulfite pulping process in paper industry

Sulfite liquor that formerly used to be discharged into river is burned in this furnace to regenerate pulping chemicals and produce steam



two or more different processes to set up a single chemical recovery system. Stream or river dumping would no longer be necessary.

Consolidated has modified one digester in its 100-tons per day pulp mill to use soda base sulfite pulping. If the new process performs as hoped for, company expects to expand the recovery plant's capacity to process all recoverable spent sulfite and semi-chemical liquor from the entire mill.

Process Details

Basic principle of process is the conversion of spent sulfite liquor into a non-corrosive solution that resembles the air-oxidized black liquor in kraft recovery. It is this similarity that permits conventional kraft recovery equipment to be used.

Briefly, here is how it works. Spent liquor from pulping process is mixed with sodium sulfide and carbonate, which have been recovered from a previous batch. It is then fed into a thickener. The pH is held at 11.8 by control-

ling ratio of additives. Insoluble material and any fine pulp fibers still in the liquor, are removed.

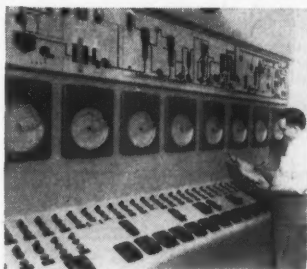
Alkaline liquor is then blown into a foam with air in a diffuser-type oxidizer. This speeds reaction of recycled sulfide with the lignin-sulfonates from the pulp. Thio-sulfates and polythionates are formed as reaction brings sulfur to zero valence state. All sulfite ions not in combination with liquor are reacted to the non-corrosive thiosulfate.

Liquor at this point is free of sulfite ions and has pH of 10.7. This alkalinity is high enough to prevent precipitation of desulfonated lignin. Liquor leaving oxidizer resembles kraft black liquor and contains similar chemical compounds.

Burned at 1600°F

Liquor thus treated is evaporated to 65% solids and burned in a recovery furnace at about 1600°F. Furnace acts as chemical process unit as well as a high-pressure steam generator. Unit produces about 75,000 lb steam per day. Smelt formed by combustion contains sodium sulfide and carbonate in equimolar ratio. Sulfur equivalent to that in spent liquor is driven off as sulfur dioxide in flue gases.

Molten smelt from furnace is dissolved in water to form a nearly saturated green liquor which is evaporated to recover pure sodium carbonate crystals. Remaining mother liquor is sent back to thickener for recycling with spent liquor from pulping. The



Nerve center of plant is this control panel



Apply Cementable Teflon to hoppers, mixers, feeders, chutes, packaging machines. Chemically-inert Teflon moves powders and mixtures swiftly, freely. Prevents material build-up without vibration equipment or manual attention.

CUT CLEANING TIME * WITH Teflon LININGS!

Absolutely nothing sticks to slippery Cementable TEFLON. For clean up, just wipe off surfaces . . . no time wasted in scraping or soaking with special solutions.

Odorless, colorless, non-absorbent, non-contaminating, Cementable TEFLON will withstand 500° F. with use of high temperature adhesives. It can be bonded to metal, wood, glass, other surfaces. Available in continuous tapes .005" through .096", through 24" wide; and in sheet through 48" x 48".

Cementable TEFLON, as made by Garlock's Plastics Division, the United States Gasket Company, can save you time and money. Find out how by contacting one of The Garlock Packing Company's 30 sales offices and warehouses in the U.S. and Canada, or write for Catalog AD-158.

*DuPont Trademark for T.F.E.-fluorocarbon resin

**United
States
Gasket**

**THE GARLOCK PACKING COMPANY
Palmyra, N. Y.**

Plastics Division of
GARLOCK



Check 2738 opposite last page



Aloyco Valves on 26-year duty in hot acid system

Still going strong in the sulphite pulp mill of Eastern Fine Paper and Pulp Division, Standard Packaging Corp., at South Brewer, Maine, is the Aloyco Stainless Steel "Y" valve, above.

This, and other Aloyco Valves were purchased in 1933 when the hot acid system was installed here. They have been in continuous use ever since.

Long trouble free service is the reason so many U. S. plants are turning to stainless steel and high alloy valves... even for mild corrosive service.

Only one company has specialized in corrosion-resistant valves exclusively for 30 years: Alloy Steel Products Co. Call us in on your next valve job. Write us at 1302 West Elizabeth Ave. 9.7



ALLOY STEEL PRODUCTS COMPANY
Linden, New Jersey

Check 2739 opposite last page

IDEAS

sodium carbonate is filtered, washed, and dissolved in water.

Furnace gases with high level of sulfur dioxide are put through a scrubbing tower where they are reacted with purified sodium carbonate stream to create a weak sodium sulfide-bisulfite liquor. This is then run through a raw acid tower where it is reacted with make-up sulfur dioxide from a conventional sulfur burner.

From the acid tower, the full-strength cooking liquor is fed into the accumulator for the chip digester. Major part of sulfur dioxide added to raw acid tower is to replace that lost when digester is blown.

(W-P recovery system was developed by Western Precipitation Corporation, 1000 West Ninth Street, Los Angeles, California.)

Check 2740 opposite last page.

Bend it, twist it, roll it, flexible magnetic strip still works

Product can be magnetized
in any direction

Flexible magnetic strip is now being produced which is said to have magnetic properties superior to most conventional magnetics. The material consists of Koroseal vinyl plastic specially compounded and processed to react exactly like metal or ceramic magnets.

Unlike a steel magnet, which can be magnetized only lengthwise, the new flexible magnet can be spot or shape magnetized in any direction. It is attracted to ferrous metals or to itself. Magnetic permanence is excellent.

Material is currently being produced in continuous lengths in an unlimited number of shapes ranging in size from spaghetti to garden hose. It can be cut without impairing its magnetic qualities.

One of the biggest uses at present is as refrigerator gasket seals. The magnetic strip is used inside a flexible Koroseal gasket to form an airtight

REDUCE OPERATING COST of VACUUM SYSTEMS with this "AERO" (air-cooled) VAPOR CONDENSER

With free air the cooling medium you use the least water, evaporated in the air stream. You save the cost and pumping of large volumes of condensing water.

Air-vapor subcooling reduces mixture evacuated from the system, saving in the operation of steam ejector or vacuum pump.

This air-cooled condenser gives you more capacity than other types at a substantial saving of steam and power. Water supply, scaling treatment and disposal problems are eliminated.

You get pure condensate, an improved product; often make a profit on recovery of residues now wasted. There can be no contamination of your product at any time; it never touches raw water. Condensing, of water, of solvents or of your product, is simplified; you have one, compact,



Niagara Aero Vapor Condenser. This compact machine may be installed directly above stripping column or vacuum evaporator.

easily maintained unit replacing both cooling tower and barometric or surface type condenser.

Maintenance expense is low. Balanced Wet Bulb Control provide precise, year 'round adjustment of capacity to load.

Constant temperature, uniform products and maximum production 12 months a year are assured. Unit capacities up to 15 million BTU.

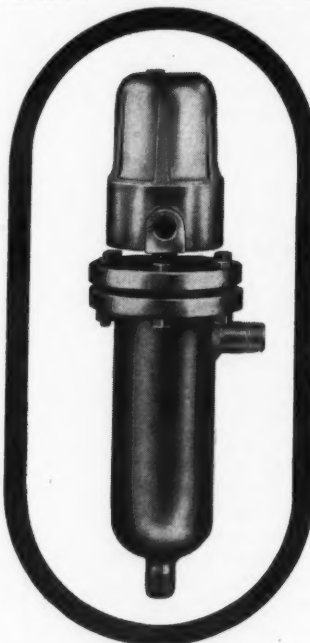
Write for full information. Ask for Bulletin 129R

NIAGARA BLOWER COMPANY

Dept. CP-7, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Check 2741 opposite last page



SAFE-SURE Liquid Level Control by LEVEL MASTER®

Here's your supply source for a complete line of standard and custom controls. Pictured is one of our Chamber Controls—an example of our broad line of standard units. We also specialize in custom controls of all types. The long-lasting magnetic proximity switch, incorporating a permanent Alnico V magnet, responds instantly to changes in liquid level.

- Models for all types of liquids.
- Horizontal, vertical, external mountings.
- Precision engineered for long life operation.

For full information consult your Level Master representative or write directly to:

Jo-Bell Products, Inc.

5456 W. 111th St. • Oak Lawn, Ill. • Phone GArden 5-0240

Jo-Bell Products, Inc.

5456 W. 111th St., Oak Lawn, Ill.

Send full information on Level Master and name of nearest representative.

My name _____

Company _____

Address _____

City _____ Zone _____ State _____

Check 2742 opposite last page

CHEMICAL PROCESSING



Flexible magnet is made of plastic specially compounded to react like metal or ceramic magnets. Product is expected to find large variety of uses

seal around entire perimeter of refrigerator door. This eliminates need for a latch, since strength of magnetic strip is enough to hold door closed.

(Koroseal flexible magnetic strip is product of B. F. Goodrich Industrial Products Co., a division of the B. F. Goodrich Co., Akron, Ohio.)

Check 2743 opposite last page.

Thermoelectric generator producing 5000 watts to be constructed

A 5000-watt thermoelectric generator will soon be built for Bureau of Ships, United States Navy. Unit will reportedly have power output larger than that of any generator of its type yet constructed. It will convert heat of burning fuel directly into electricity.

The prototype generator is first step in solving material selection, fabrication, assembly, and operating and control problems of later-planned large-scale thermoelectric power plant for shipboard installation.

Heat source will probably be fuel oil. Cool side of generator will be maintained by sea water directly or fresh water cooled by sea water in heat exchanger.

(Thermoelectric generator will be produced by Westinghouse Electric Corporation, Box 2278, Pittsburgh 30, Pa.)

Tests speed evaluating material's resistance to radiological corrosion

Help engineers choose best products

Materials can now be more rapidly checked for radiological corrosion resistance by the use of a recently developed spot-test procedure. The technique is proving to be of great value to design engineers in helping them more quickly and accurately select products having good potential merit in this respect.

Developed at University of California, the test actually is composed of a series of tests — chemical corrosion, radiological contamination and decontamination, and irradiation.

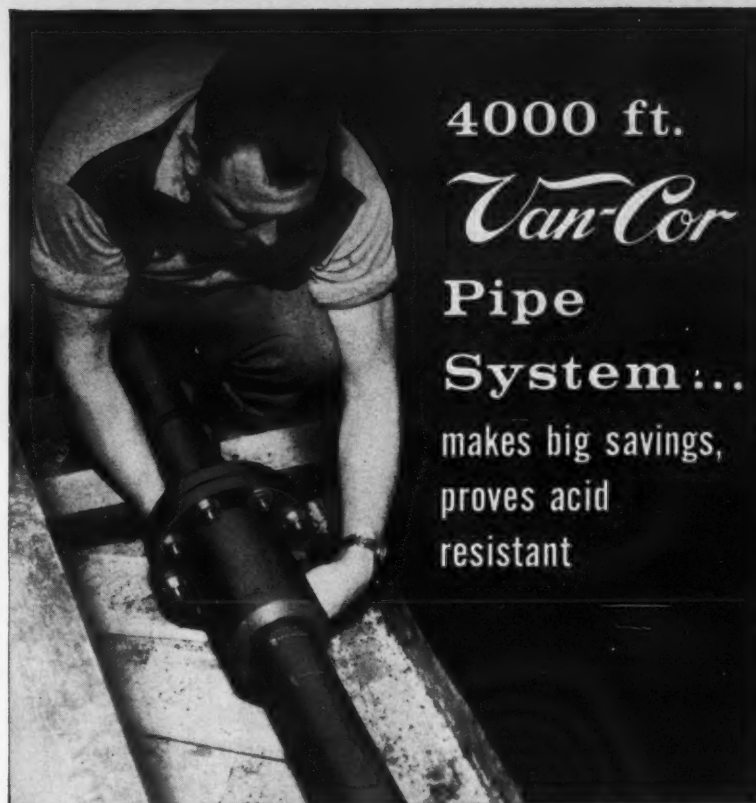
First step in the procedure consists of dividing the surface of a test panel into 20 numbered squares. This can be done by scratching with a sharp instrument or by use of ink. One drop of each of 18 chemical reagents is then placed on the squares of the test panel. Numbers on squares correspond to reagent number. Squares 19 and 20 are reserved for special reagents. Reagents are kept in contact with panel for 96 hours.

If material shows promise on these tests, further tests are conducted. Immersion or cup tests may be used in which weight, hardness, or other pertinent changes are noted quantitatively.

Radiological Tests

After a material has successfully passed the chemical-corrosion tests, it may be tested for radiological corrosion. This consists of two categories: 1) contamination-decontamination, and 2) irradiation.

First test involves contaminating the surface with about 1 microcurie per sq in of any high-specific-activity radio nuclide. Material is deposited in solution form at about 1 N nitric acid concentration. After one hour in acid state, an excess of ammonium hydroxide is added. Solution and



4000 ft.
Van-Cor
Pipe
System...
makes big savings,
proves acid
resistant

At the Allentown (Pa.) Works of the Western Electric Co., the entire waste acid disposal system in the recent addition consists of Van-Cor rigid PVC pipe and fittings.

HOW COSTS WERE CUT. Initial price of Van-Cor was $\frac{1}{3}$ that of comparable cast iron alloy pipe. On a 6" line, labor costs were estimated at 29¢ per foot of run—about half that of metallic pipe. Also, because Van-Cor has only 1/10 the weight, no mechanized handling equipment was needed. Available in 10 or 20 ft. lengths, Van-Cor requires fewer joints, and eliminates the breakage problem.

CORROSION LICKED. Van-Cor pipe was used because "corrosion resistant" cast metallic pipe had performed short of expectations in an adjacent building. After 1½ years service, the Van-Cor system is in excellent shape, unaffected by such acids as hydrofluoric, hydrochloric, sulphuric, nitric and many plating solutions.

Investigate Van-Cor Pipe, Fittings, Valves, Electrical Conduit, and Fabrications...

Write for Catalog and Name of Nearest Distributor

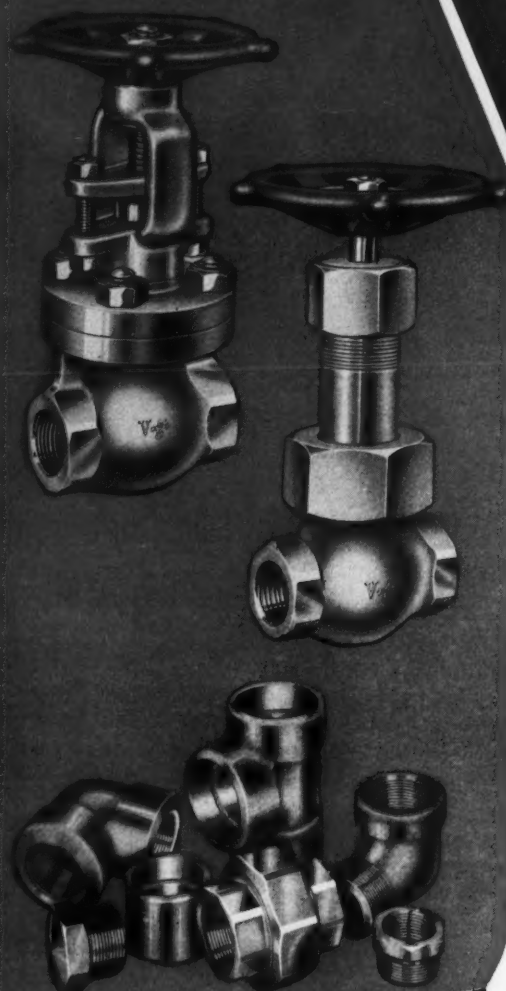


INDUSTRIAL DIVISION OF
COLONIAL PLASTICS MFG. CO.
Subsidiary of THE VAN DORN IRON WORKS CO.
2685 EAST 79TH STREET CLEVELAND 4, OHIO

Check 2744 opposite last page

Look
to...

Vogt



FOR FORGED STAINLESS AND ALLOY STEEL

Valves, Fittings and Unions

IN STOCK AND READY TO GO!

BE SURE to consult the new Vogt Catalog F-10 when in need of top quality forged stainless and alloy steel piping products for severe operating conditions.

The complete Vogt line includes sizes and types to fit your process requirements with high resistance to corrosion, complete freedom from product contamination, and long service life.

HENRY VOGT MACHINE CO.
Louisville 10, Ky.

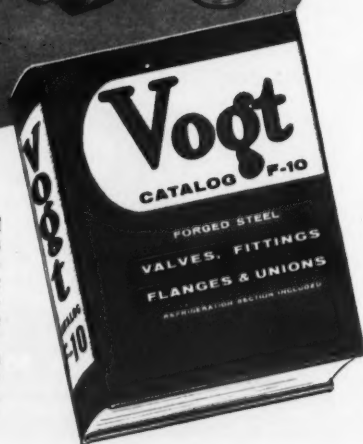
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N.J., St. Louis, Charleston, W.Va., Cincinnati

CATALOG F-10

Vogt stainless and alloy steel materials are shown in their application to specific types of piping products in this 432 page catalog.

Write for a copy on your company letterhead. Address Dept. 24A-FCP.



IDEAS

resulting precipitate, if any, is dried for 24 hours at room temperature.

To make contamination test, a count is made of the radioactivity to determine initial activity. Surface is then washed with distilled water, wiped, air dried, and re-counted to constant level.

Contamination Criteria

Portion of radionuclide which is easily removed with water is not considered to be true contamination. Percent retained gives indication of propensity of a material to pick up and cling to radioactivity.

Portion which is not easily removed by water is considered as the initial activity for subsequent decontamination test. Series of washes is made with following reagents in this order: 10% Dreft, 10% citric acid, and 10% nitric acid.

Samples are washed, rinsed with distilled water, wiped, and counted to constant level between each reagent test.

Tentative minimum acceptance standards are:

Reagent	% Retained
Distilled water	10
Dreft	10
Citric acid	1
Nitric acid	0.1

Experience has indicated that materials not meeting these specifications will be difficult, if not impossible, to decontaminate under actual field conditions.

Irradiation Test

Irradiation tests involve placing samples of material in a 2000-curie cobalt-60 source delivering a dose rate close to 10 million roentgens per hour for various total exposure periods. Chemical spot tests after radiation may then be made and compared with those before exposure.

(Spot tests and radiological corrosion work was done by A. E. Salo and N. B. Garden, under auspices of AEC, at Lawrence Radiation Laboratory, University of California, Berkeley, California.)

Check 2745 opposite last page

French A-power plant to use computers to check cooling gas radioactivity

Will monitor CO₂ flowing
through channels

Digital control computers are going to be used to detect ruptured fuel cartridges at France's first commercial nuclear power plant. Located near Chinon, France, the reactor is scheduled to go into operation this summer.

Two compact computers will be used to monitor the radioactivity of carbon dioxide cooling gas flowing through 1148 channels in the reactor. A pinhole, split, or other fault in one of the uranium fuel slugs will cause a gradual increase in the radioactivity of the cooling gas, and must be detected before radiation reaches an unsafe level.

The channels will be divided into 287 groups of four each. Every minute 12 channels in different groups will be switched to 12 detectors for a "coarse" scanning cycle. All groups will be scanned in 24 minutes.

Binary counters will accumulate and present to the computers two sets of measurements: a background gas activity count and a relative gas activity count. From these data and from the measurement of the general activity in the reactor, the computers will calculate the change in the radioactivity of the cooling gas in each group of channels.

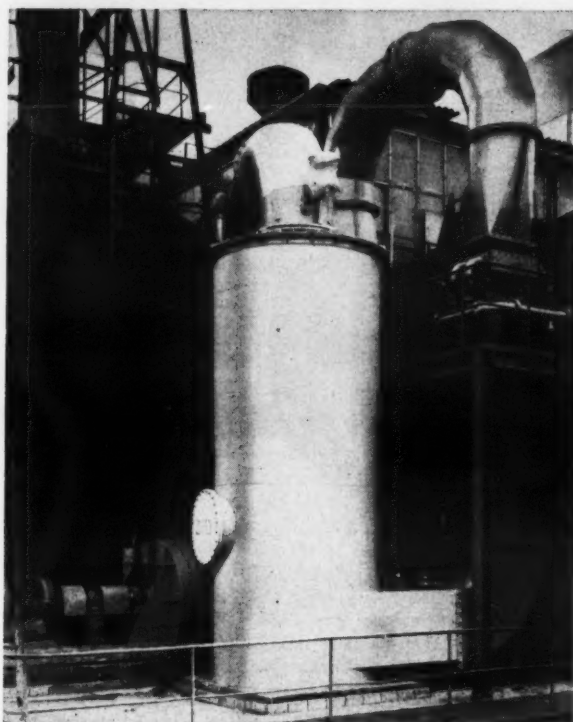
The power plant will have rated output of 300 megawatts of heat and 80 megawatts of electricity. Reactor will require 100-150 tons of natural uranium as fuel and 1200 tons of carbon as moderator. The carbon dioxide coolant, at 360 psi, will transfer heat from reactor to heat exchanger. (RW-300 digital control computers are product of the Thompson - Ramo - Wooldridge Products Company, a Division of Thompson Ramo Wooldridge, Inc., P.O. 90067 Airport Station, Los Angeles 45, California.)

Check 3243 opposite last page.

AIR POLLUTION

growing problem in the chemical industry

Chemico Gas Scrubbers offer practical solution in variety of CPI applications



The Chemico venturi scrubber installed on this phosphoric acid plant removes and recovers better than 99% of the phosphoric acid mist. In this instance, both venturi and cyclonic separator are rubber-lined to withstand the effects of the acid.

FULL DETAILS AVAILABLE

For your copy of a new brochure giving complete data on Chemico venturi gas scrubbers or for technical assistance on a specific problem, write to the address below.

Dusts, fumes and mists—the unavoidable by-products of many industrial processes—often create tremendous public relations and legal problems. The chemical industry is now taking vigorous steps to remove these nuisances.

One such step has been the application of Chemico venturi gas scrubbers which remove sub-micron as well as plus-micron particles from gas streams, thereby eliminating the polluting elements. These units are based on the Pease-Anthony venturi principle which has been modified and improved by Chemico.

• • •

OUTSTANDING PERFORMANCE ON DIFFICULT PROBLEMS

Typical of the success of Chemico venturi gas scrubbers has been their recent application to sulfuric acid concentrators which have long been a source of air pollution. By the use of this equipment, better than 99% of the acid mist can now be removed, thus solving this difficult pollution problem.

SIMPLE CONSTRUCTION PERMITS WIDE APPLICATION

The simple design of Chemico venturi gas scrubbers allows for use of materials resistant to corrosion, abrasion or high temperature. This, plus their small space requirements, permits installation in existing plants handling corrosive materials as well as incorporation into new plant designs. In addition, no critical controls are required and maintenance costs are reduced to the barest minimum. Chemico venturi scrubbers have been proven for use in acid concentrators, copperas roasting kilns, chlorosulfonic acid plants, dry ice plants, phosphoric acid plants and many other chemical manufacturing operations. These are the same scrubbers which won such wide acceptance in the iron and steel industries.



CHEMICAL CONSTRUCTION CORPORATION
525 West 43rd Street, New York 36, New York

CHICAGO • DALLAS • HOUSTON • PORTLAND, ORE. • TORONTO • LONDON • PARIS • JOHANNESBURG • TOKYO

Check 2746 opposite last page

in our search for corrosion-resistant linings,
we found a better way to plate most metals

KANIGEN®



KANIGEN plated pneumatic gate valve

Reactor tube bundle with inside of tubes, outside of tube sheet and hub KANIGEN plated.

The search for a way to coat the interior of a tank car with nickel alloy led General American Transportation Corporation to develop KANIGEN—a method of applying a hard, uniform, corrosion-resistant nickel alloy coating of the exact thickness desired to most metals.

Complex shapes and unusual sizes, from a 20,000 gallon tank car to a tiny control valve, are no problem for

KANIGEN. There are no "throwing power" limitations, since no electric current is used.

Protected by international patents, KANIGEN is backed by the world-wide resources of General American.

KANIGEN plating may be obtained from General American or from its licensees throughout the country. For further information, write today.

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GENERAL AMERICAN TRANSPORTATION
135 South LaSalle Street • Chicago 90, Illinois



CORPORATION

Check 2747 opposite last page

CORROSION CONTROL FEATURE SECTION HIGHLIGHTS

Growing need of corrosion control for our national survival 71

Stainless protects Pfizer products 77

Fittings broaden application for plastic pipe . 80

Cathodic protection prevents pitting of metal 86

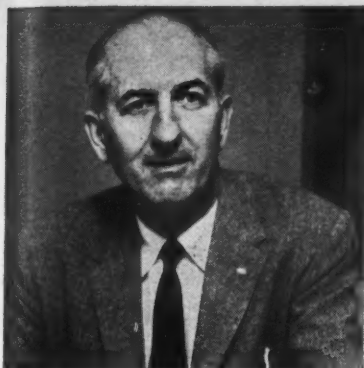
Condensations of recent technical papers . . . 92

Technical literature on corrosion control 96

Corrosion Keys on polyvinyl chloride pipe . . 101

Plus . . .

Many other articles on the latest equipment, materials, and methods for fighting corrosion



Guy F. Williams was recently elected to the Board of Directors of the National Association of Corrosion Engineers, representing corporate membership — which consists of those companies which provide financial support for the NACE in battling corrosion.

Mr. Williams is associated with the Dowell Division of The Dow Chemical Company, his present position being Assistant to the Director of Sales. He is charged with the responsibility for providing chemicals for combating corrosion and for chemical cleaning.

He has had long and varied experience in corrosion control. He is the author of a number of technical papers on reducing corrosion in steam generating and cooling equipment by chemically removing scales, sludges, and oxides. Cathodic protection is another activity with which Mr. Williams has been concerned. His most recent work has been mainly in the field of applying polar-type corrosion inhibitors.

ALTHOUGH it has long been of vital importance to decrease corrosion from the standpoint of avoiding waste of the billions of dollars lost each year — it has now become imperative to achieve maximum control of corrosion to assure survival of our nation. Besides being of prime interest to American industry, corrosion technology now has national international significance.

This fact was pointed out by Aaron Wachter in his remarks as he accepted the Speller Award in Corrosion Engineering at the Fifteenth Annual Conference and Cor-

Russia's emphasis on corrosion control in engineering schools and through technical conferences — and the crucial need for corrosion technology for nuclear power and for rocketry show the . . .

Growing Need of Corrosion Control for National Survival

GUY F. WILLIAMS

rosion Show held at Chicago during March 1959 by the National Association of Corrosion Engineers:

"Communications, transportation, electronic and computing machine industries (to mention only a few) will be increasingly concerned with reliable performance of their complex and closely engineered units under all conditions," said Mr. Wachter. "New activities and further expansion in nuclear power and in rocketry give rise to demands on corrosion technology which are of critical importance. In fact, to an increasing degree in all industries, new advances are found to depend on ability to overcome critical corrosion difficulties."

Mr. Wachter went on to comment on Russian activities in the corrosion field: "It is popular these days to compare American activities in various fields with those in Russia. I don't have extensive data for such comparison, but it is interesting to learn that last year the U.S.S.R. held a conference on corrosion in Moscow attended by several thousand of their scientists and engineers at which some 200 papers were presented.

I am also informed that all engineering students are required to complete a one-semester course in corrosion at

the University of Moscow. It would seem that they are determined not to let their side of the iron curtain get rusty! These slight indications are worth serious thought and should at least keep us from feeling too complacent about our progress."

Among our allies, West Germany has been holding regular international technical conferences on corrosion control. England has also devoted much attention to the subject.

Although present efforts to reduce corrosion costs are producing beneficial results, more can undoubtedly be

done. What steps can the chemical processing industries take to lower the toll exacted by corrosion?

Corrosion Literature

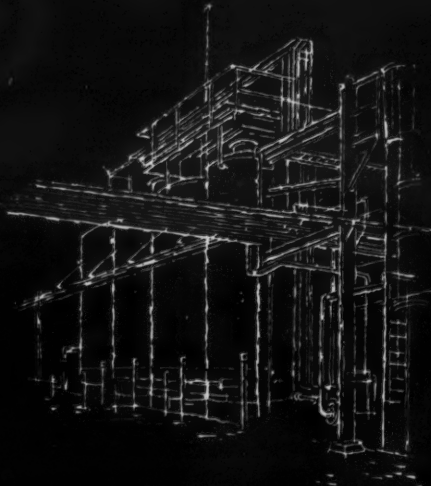
One thing that companies should do is to keep abreast of new developments in the field of corrosion mitigation and apply these advances to their own corrosion problems. Helpful contributions to knowledge of corrosion control techniques appear frequently in chemical publications. An excellent example is the special corrosion section which follows this discussion. **CHEMICAL PROCESSING** carries a regular section on Corrosion Control each month. Studying such published corrosion literature often provides answers to perplexing difficulties.

Papers presented at technical society meetings are another valuable source of information on new developments in corrosion technology. For example, new approaches to many problems were discussed in papers presented at the March 1959 NACE conference. Condensations of some of the more pertinent of these start on page 92. Among topics discussed were the use of titanium, zirconium, and glassed steel, and

To page 74



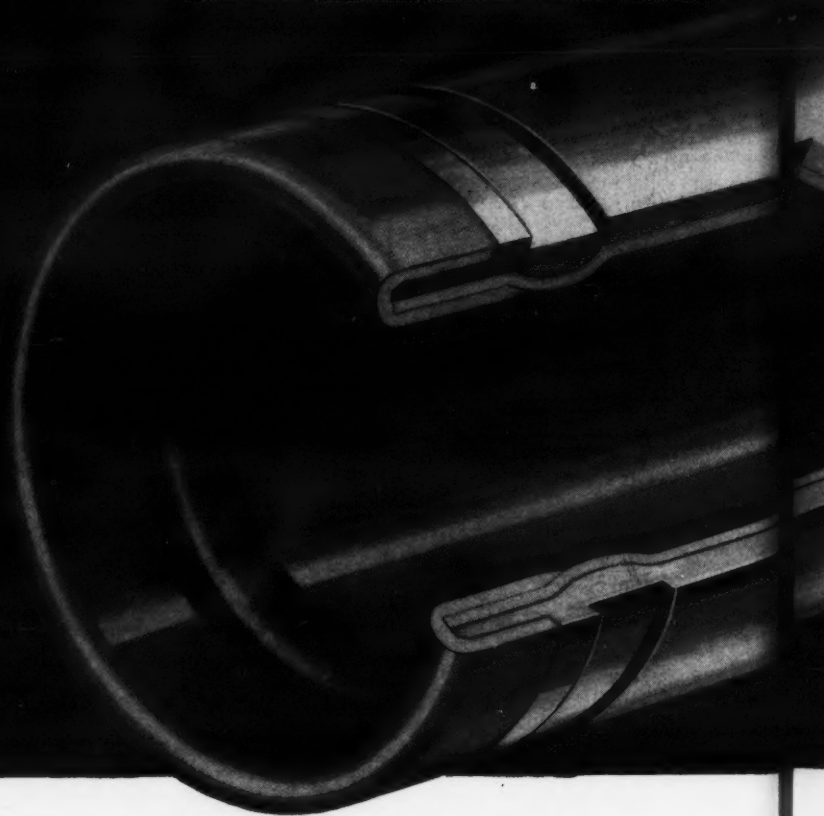
Mr. Williams inspects spectroscopic instrument used in Dowell Research Laboratory in Tulsa to analyze corrosion products, to determine causes of corrosion and aid in development of suitable corrosion inhibitors



NEW "JAL"

handles corrosive liquids

- at pressures to 1000 P.S.I.
- at temperatures to 150°F.



New "Jal-Jacket" pipe, combining the corrosion resistance of rigid polyvinyl chloride with the strength of steel, offers you these cost-cutting advantages in handling corrosive liquids.

LOW INITIAL COST. "Jal-Jacket" pipe costs less than other lined metal pipe.

LOW COST INSTALLATION AND MAINTENANCE. Ends grooved for Victaulic couplings permit

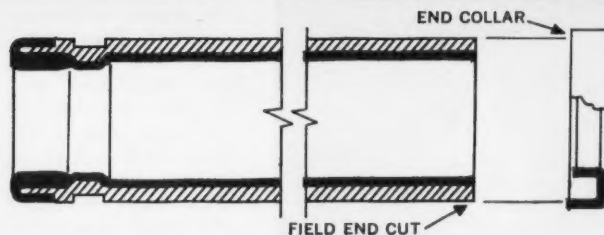
quick, easy make-up. Entire systems can be dismantled and re-assembled without damage to the PVC lining. "Jal-Jacket" can be cut to length and joined on the job. Requires no troughs or other costly supporting devices.

LONGER SERVICE LIFE. Plastic liner is bonded securely to the steel jacket. The ends are fully protected with plastic providing continuous protection from chemical attack. Steel jacket assures a tough, rugged product.

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PITTSBURGH, PENNSYLVANIA

JACKET" PIPE*



*a rigid unplasticized polyvinyl chloride tube jacketed with electric-resistance welded steel pipe.

"Jal-Jacket" is currently available in 20 foot mill lengths in three sizes, 2 $\frac{3}{8}$ ", 3 $\frac{1}{2}$ ", 4 $\frac{1}{2}$ " O.D. Get complete details by mailing this coupon today.

Jones & Laughlin Steel Corporation

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☐ Have J&L representative call

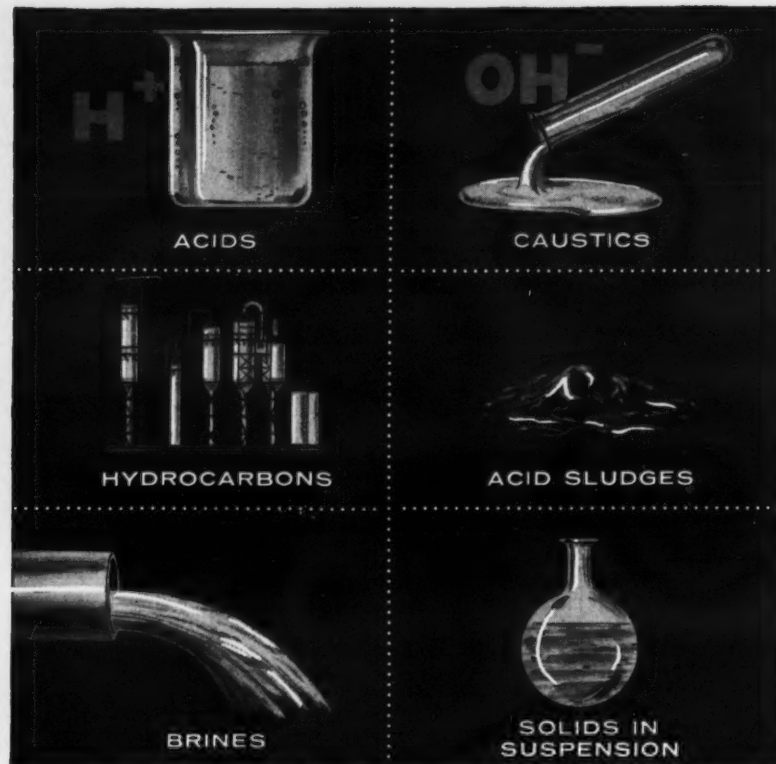
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For more information on product at left, circle 2748 see information request blank opposite last page.





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**COPE WITH THESE
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 to keep on stream?



you combat them all with an
AMPCO[®] METAL

What can a copper-base alloy do for you? Whatever it is, there's a grade of Ampco Metal — or other Ampco alloy — that does the job exactly.

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 WEST COAST PLANT: BURBANK, CALIFORNIA • SOUTHWEST PLANT: GARLAND (DALLAS COUNTY), TEXAS

Check 2749 opposite last page

CORROSION CONTROL

Guy Williams

From page 71

the use of corrosion-resistant coatings such as glass cloth, epoxy resins, rubber, and plastics. Many other means of combating corrosion were also presented, a large percentage of which have been developed only in recent years.

Chemical Cleaning

During the past several years, chemical cleaning of industrial equipment has become an important tool in controlling corrosion. Chemical cleaning — the use of properly selected, inhibited solvents to remove scale deposits and corrosion products that accelerate corrosion in process equipment — has been used effectively to clean virtually every type of industrial equipment subject to undesirable deposits.

Many new advances in chemical cleaning have occurred recently. Improved inhibitors for acid solvents now give plant equipment better protection than ever before. Specialized solvents have been developed to handle difficult cleaning problems. One such solvent safely removes both copper and scale deposits from boilers in a single-stage cleaning service.

Chemical cleaning can now provide standards of cleanliness that were unheard of previously, because of new cleaning techniques devised for cleaning piping systems in rockets and missile-launching facilities. These high standards are necessary because residual particles as small as several microns in size could affect the performance of many missiles now being fired from launching pads at Cape Canaveral and other sites. Special solvents and equipment have been developed to meet these critical standards.

NACE Corporate Membership

The chemical processing industries can also reduce corrosion losses by supporting the one organization dedi-



Made from
TEFLON^{*}

For

Chemical Feed Lines (laboratory, catalyst, pilot plant reusable),
 Hot Corrosive Liquids or Steam
 Lines, Hydraulic Hose, Braiding and
 Fittings for Pressure Use

*And Similar Applications Where
 Only PF TEFLON^{*} Can Do The Job*

PROPERTIES

- complete chemical inertness
- lowest coefficient of friction of any solid material
- very low permeability
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- easily cleaned and sterilized without deterioration

Pa. F. flexible tubing is available in a full range of colors and sizes. Our extrusion techniques yield maximum service flexibility and all sizes are carefully inspected and controlled dimensionally.

Write, wire or 'phone for additional details, competent engineering assistance and prompt attention to special sizes and walls. Pressure testing and certification upon request.

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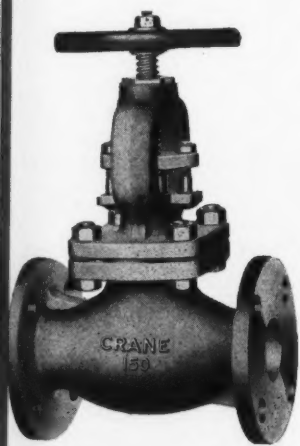
^{*}"Teflon"—DuPont trade name
 for Tetrafluoroethylene resin
 TWX PH 252

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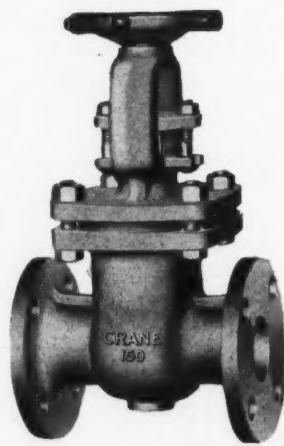
CHEMICAL PROCESSING

Valves that beat your corrosion problems

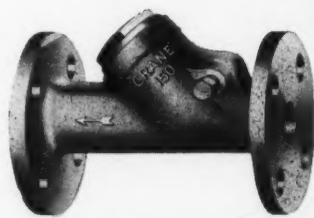
Crane 18-8 SMO
and "Craneloy 20"



Globe and Angle Valves



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CRANE®

18-8 SMO and "CRANELOY 20" GLOBE and ANGLE VALVES with Swivel Disc

Performance-proved for sensitive flow control and positive sealing of highly corrosive fluids, vapors and gases

These corrosion-resistant valves were designed and perfected by Crane to combat the principal causes of valve damage: erosion, cutting and scoring. The stout heart of these valves is the

IMPROVED SWIVEL DISC-STEM DESIGN

The disc is a modified plug type, combining the easier seating of a narrow ball-to-flat seat and better resistance to erosion and scoring provided by a wide, plug-type disc.

In addition, Crane's exclusive "guided disc" design brings the stem thrust closer to the seating surface and assures positive closure. Minimum clearance between disc and stem eliminates vibration and chatter, but permits free swivel action at the disc-stem connection. As a result, the disc seats firmly with minimum torque and without galling and seizing.

All parts of these valves in contact with flow are Crane 18-8 SMO or "Craneloy 20," cast by Crane under closest supervision. See page 4 for composition of Crane 18-8 SMO and "Craneloy 20."

OTHER DESIGN FEATURES

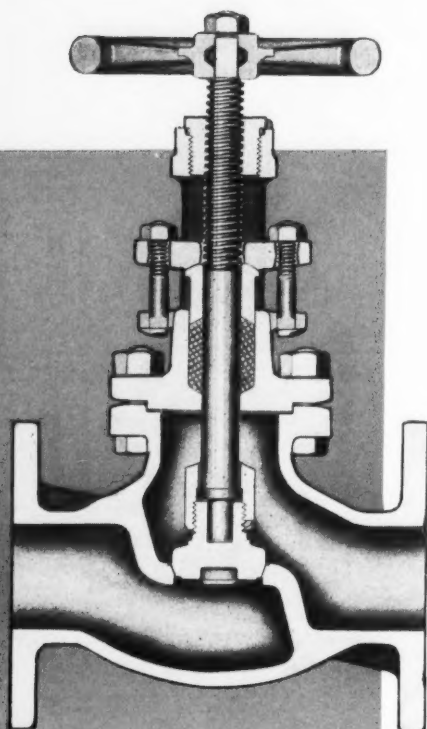
Body. Designed for smooth flow with minimum pressure drop and turbulence. Seats are integral.

Bonnet. Bolted OS&Y. Body-bonnet joints are retained gasket type. Stainless steel bolts, four or more, are used.

Packing gland. Two-piece, ball-type. Maintains uniform pressure on packing without danger of binding stem. Stainless steel carriage bolts are used.

Materials. Body, bonnet, stem, disc assembly, and packing gland—Crane 18-8 SMO or "Craneloy 20." Yoke bushing—cast manganese bronze. Teflon bonnet gasket. Teflon packing.

WORKING PRESSURES AND SIZES. Ten sizes, $\frac{1}{2}$ " to 6". 150 psi at 500 F; 230 psi at 100 F. Screwed and flanged ends. Flanged facings have serrated finish. All valves OS&Y.



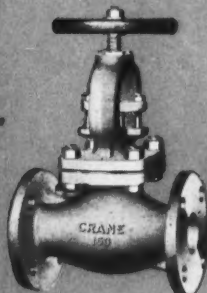
Close-up of Crane swivel disc-stem connection. Minimum clearances between disc and stem prevent vibration and chatter. Long "guide" on end of stem assures accurately aligned seating.



Globe valves, flanged ends $\frac{1}{2}$ " to 6"

No. 18811
18-8 SMO

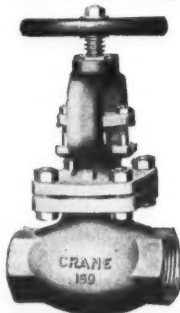
No. 20011
"Craneloy 20"



Globe valves, screwed ends $\frac{1}{2}$ " to 2"

No. 18810—18-8 SMO

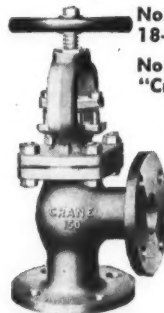
No. 20010—"Craneloy 20"



Angle Valves, flanged ends $\frac{1}{2}$ " to 6"

No. 18813
18-8 SMO

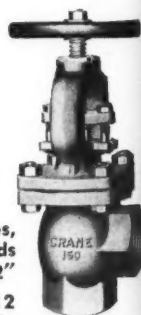
No. 20013
"Craneloy 20"



Angle valves, screwed ends $\frac{1}{2}$ " to 2"

No. 18812
18-8 SMO

No. 20012
"Craneloy 20"



CRANE®

18-8 SMO and "CRANELOY 20" GATE VALVES with Split-Wedge Disc

**Designed for long life, tight seating,
easy operation and low cost maintenance
on toughest corrosive services**

Corrosion . . . wear . . . galling . . . seizing—all costly enemies of valves in chemical processing plants—meet their match in Crane 18-8 SMO and "Craneloy 20" gates.

Key to the success of these popular valves is the unique seating design perfected by Crane. The potential weaknesses of ordinary split-wedge disc valves used on corrosive services have been eliminated.

CRANE SPLIT-WEDGE DISC DESIGN

This simple construction features identical disc halves (an exclusive Crane development), which means that seating loads are transmitted equally to each half, assuring uniform pressure on seating faces. There is no danger of buckling a weaker disc member, as in conventional ball and socket disc construction. In opening, the first turn of the handwheel frees the discs—even if the valve is closed hot and opened cold.

Special guide flanges on the discs, *another Crane feature*, prevent disc drag across the seat during operation. This means longer seat life. The free-to-rotate discs prevent concentrated wear, galling and seizing.

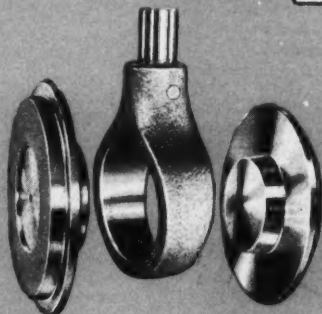
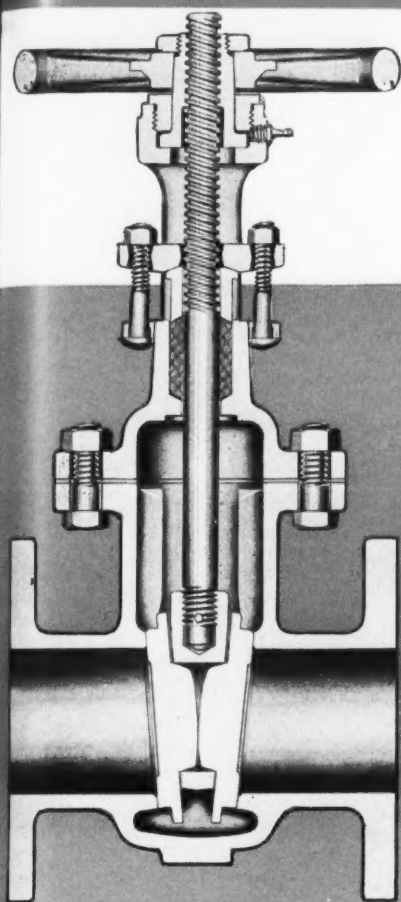
All valve components in contact with flow are Crane 18-8 SMO or "Craneloy 20." All castings are produced under rigid control in Crane's own foundry. Stuffing boxes are packed with tough, resilient, non-contaminating Teflon.

CRANE QUALITY IN EVERY DETAIL

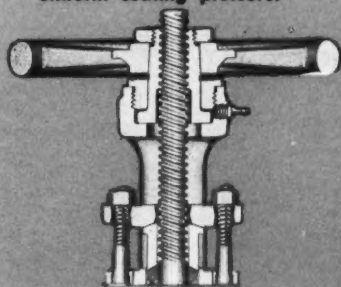
1. Internal areas proportioned for smooth flow, minimum turbulence.
2. Teflon stem packing.
3. Two-piece, ball-type packing gland. Assures uniform pressure on packing without binding stem.
4. Crane exclusive split-wedge disc assembly.
5. Teflon bonnet gasket.

Materials. Crane 18-8 SMO or "Craneloy 20" in body, bonnet, stem, disc, disc carrier and gland. Integral seats. Stainless steel bonnet and gland bolts. Cast manganese bronze yoke sleeve. Malleable iron handwheel. See page 4 for composition of Crane 18-8 SMO and "Craneloy 20."

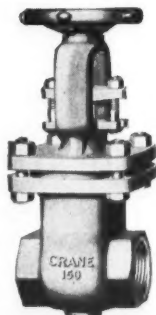
WORKING PRESSURES AND SIZES. 13 sizes— $\frac{1}{2}$ " to 12". 150 psi at 500 F; 230 psi at 100 F. Screwed and flanged ends. Flanged facings regularly have serrated finish. All valves OS&Y.



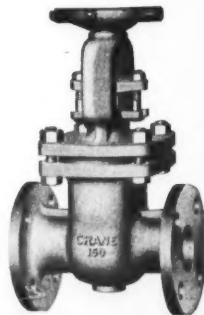
Crane split-wedge disc design. Identical disc halves assure uniform seating pressure.



To facilitate easy opening in valves $2\frac{1}{2}$ " and larger, Crane provides a grease fitting for stem lubrication.



Gate valves—screwed ends
 $\frac{1}{2}$ " to 2"
No. 18844—18-8 SMO
No. 20044—"Craneloy 20"



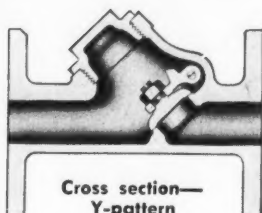
Gate valves—flanged ends
 $\frac{1}{2}$ " to 12"
No. 18845—18-8 SMO
No. 20045—"Craneloy 20"

CRANE CORROSION-RESISTANT VALVES

CRANE®

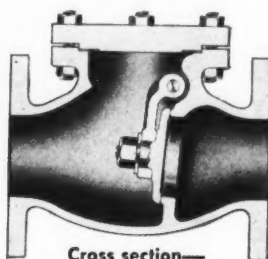
18-8 SMO and "CRANELOY 20" SWING-CHECK VALVES

to help maintain Crane quality throughout your piping systems



Cross section—
Y-pattern

Y-pattern valve features. Valve is equipped with an access opening in line with the seat; disc can be rotated with a screw driver to permit regrinding of seating surfaces without removing the valve from the line. Smooth interior contour assures easy flow.

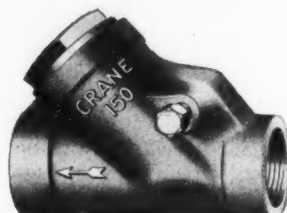


Cross section—
straightway pattern

Straightway valves. Integral seat, with seat face at minimum angle from vertical to permit smooth flow with low turbulence. Cap secures tightly with stainless steel bolts and nuts, yet permits easy dismantling for maintenance.

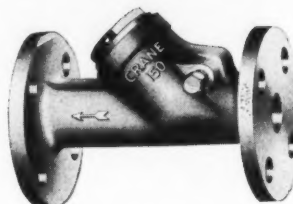
WORKING PRESSURES AND SIZES

Ten sizes: Y-pattern, 1/2" to 2"; straightway pattern, 2 1/2" to 6". 150 psi at 500 F; 230 psi at 100 F. Y-pattern valves in screwed and flanged ends. Straightway valves in flanged ends only.



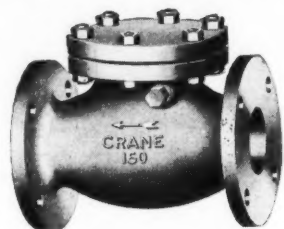
Y-pattern—
screwed ends
1/2" to 2"

No. 18826—18-8 SMO
No. 20026
"Craneloy 20"



Y-pattern—
flanged ends
1/2" to 2"

No. 18827—18-8 SMO
No. 20027
"Craneloy 20"



Straightway pattern
2 1/2" to 6"

No. 18829—18-8 SMO
No. 20029
"Craneloy 20"

COMPOSITION OF CRANE 18-8 SMO AND "CRANELOY 20"

Crane 18-8 SMO. Exceptionally high-grade stainless steel. Highly resistant to many corrosive fluids. Contains 18-22% chromium, 10-12% nickel, 2.5-3% molybdenum and under .08% carbon, exceeding the minimum requirements of ASTM Specification A-351, Grade CF-8M. Corresponds to AISI Type 316 wrought stainless steel.

"Craneloy 20". This high-nickel, high-chromium stainless steel was developed as a well-balanced alloy having a high order of resistance to a wide range of sulfuric

acid concentrations at elevated temperatures. Contains 28-30% nickel, 19-21% chromium, 3.6-4.5% copper, 2-3% molybdenum and under .08% carbon.

High nickel content permits alloy to contain substantial amounts of copper and molybdenum, which are essential in reducing attacks of sulfuric acid. High chromium content further insures good resistance to oxidizing media, permitting the use of "Craneloy 20" on applications where other grades of stainless steel have not proved entirely satisfactory.

SPECIFICATION DATA AND APPLICATION GUIDE FREE ON REQUEST

Get this 12-page circular—AD-2080. Gives you complete descriptive and specification data on these Crane corrosion-resistant alloy valves. Includes a helpful application guide covering many corrosive fluids. For your copy, contact your nearest Crane branch or Crane wholesaler, or write to the address below.



CRANE® VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

cated to solving corrosion problems, the National Association of Corrosion Engineers. Many companies engaged in chemical processing as well as those companies providing products and services for controlling corrosion have provided this support by becoming corporate members of the NACE.

NACE has played an important part in developing new techniques and materials for controlling corrosion. Since the organization was incorporated in 1945, it has grown until it now has more than 6000 members in the United States, Canada, and 70 foreign countries. More than 250 meetings were held last year in the five regions in the United States and the one in Canada. During the year the NACE also published more than 1000 pages of editorial material concerning corrosion, provided more than 2000 cross-indexed punch cards containing abstracts of corrosion mitigation literature, and published various books and pamphlets on corrosion problems. More than 400 technical papers were presented at NACE meetings, and numerous short courses were held on various aspects of corrosion control.

The many NACE activities mentioned have been of incalculable value to industry and have unquestionably resulted in preventing millions of dollars of corrosion losses. However, industry's increased awareness of the importance of corrosion studies, which has resulted from NACE activities, may prove to be an equally valuable result of the organization's efforts.

The increased effectiveness of organized efforts in the field of corrosion should not be underestimated. The well-coordinated NACE program concentrates research on specific projects, thus rendering efforts to solve such problems far more effective than individual, uncoordinated work would be. Examples of this can be seen in the specific tasks undertaken by the more than 200 NACE technical committees now working on industrial corrosion prob-

LAPP ALL-SERVICE ACID PROOF VALVES

SOLID CHEMICAL PORCELAIN
WITH **LAPP TUFCLAD®**

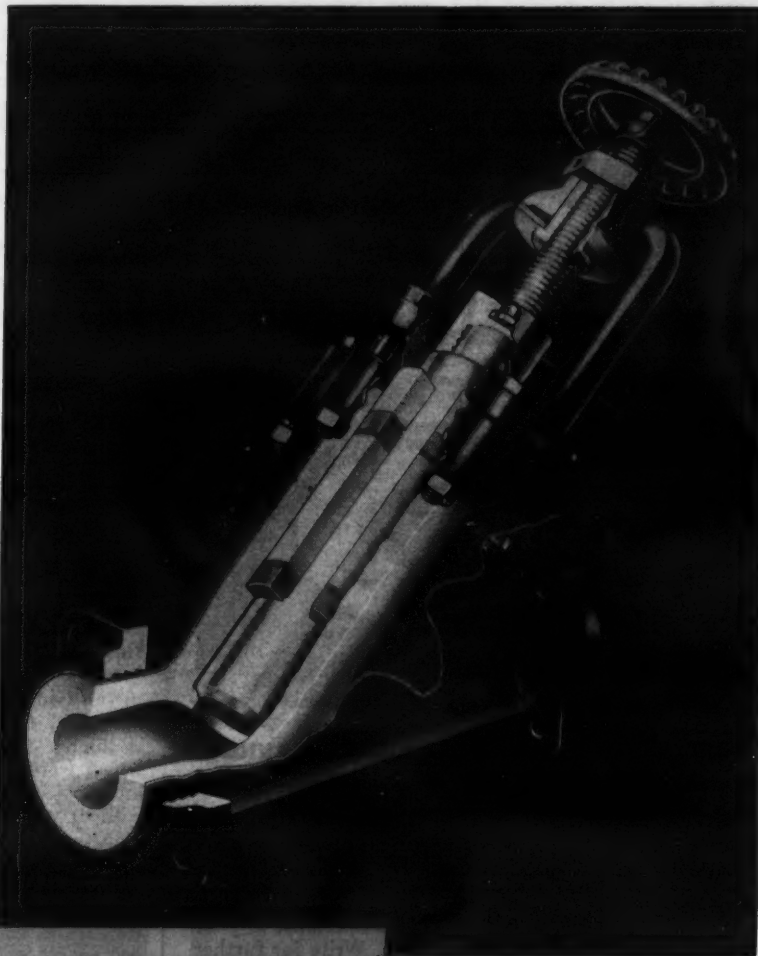
ARMOR

Nothing defies corrosion like chemically inert porcelain. As made by Lapp, it is pure, dense, hard, close-grained, homogeneous and non-porous. Therefore there can be *no penetration—no crumbling* from capillary pressures—*no absorption* of liquids to contaminate later processing.

Resistance to corrosion and contamination is but part of the Lapp story; there's a *bonus* in that Lapp Chemical Porcelain costs considerably less initially than most corrosion-resistant alloys and lined equipment. *And* since it almost never needs maintenance or replacement, the economy of your purchase is further increased.

Security (protection of plant and personnel) is assured by the Lapp TUFCLAD armor. It consists of multiple layers of fiberglass impregnated and bonded to the porcelain with an Epoxy resin. Fiberglass has high strength and chemical resistance providing protection against impact damage and external thermal shock. TUFCLAD armor holds line pressures even should porcelain become cracked or broken.

WRITE for description and specifications for the entire line of Lapp Acid Proof Valves. Lapp Insulator Co., Inc., Process Equipment Div., 2105 Chestnut Street, LeRoy, N. Y.



Lapp
**CHEMICAL
PORCELAIN**

Y-Valves as shown, and Angle Valves are available in Lapp TUFCLAD Chemical Porcelain in 1/2" to 6" sizes. Also safety valves, flush valves, plug cocks, pipe and fittings (to 8" dia.) and special shapes.

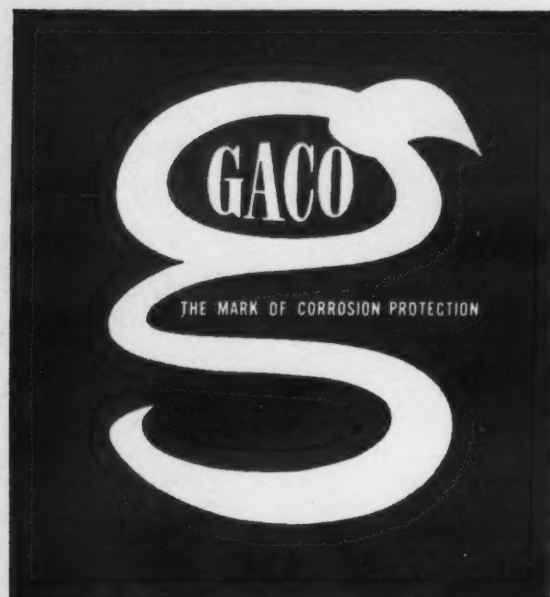
Check 2751 opposite last page



Check 3242 opp. last page

NEW GACO V-80 HOT SPRAY VINYL

5 mils of high solids vinyl in a single spray coat and process equipment is protected against corrosive fumes and high humidity. GACO V-80 Vinyl films are hard but flexible, resist abrasion and most corrosive agents, and are easily cleaned. Hot spray technique allows deposit of a low plasticizer quick-drying film with little overspray and excellent edge buildup resistance to sagging. Write for details.



FOR HEAVY-DUTY CORROSION SERVICE THE GACO CORROSION PROTECTION SYSTEM

Challenge: When paint or ordinary corrosion protection products won't do the job, specify GACO. A complete line: Neoprene, Natural Rubber, Vinyls, Liquids, Sheet, Putties . . . performance-proven in applications throughout the world. *And A Complete Service.* There's a GACO Corrosion Specialist in your area prepared to serve your needs. Write for further information—we'll forward case studies of interest.



THE MARK OF CORROSION PROTECTION

GATES ENGINEERING COMPANY
Wilmington 99, Delaware
PIONEER LEADER IN PROTECTIVE COATINGS

AUTHORIZED DISTRIBUTORS IN PRINCIPAL CITIES U.S.A. • AUSTRALIA • BELGIUM
ENGLAND • FINLAND • FRANCE • ISRAEL • JAPAN • NORWAY • OKINAWA
PHILIPPINE ISLANDS • PUERTO RICO • SWEDEN. IN CANADA: GACO PRODUCTS
LTD., BRANTFORD, ONTARIO.

Check 2752 opposite last page

CORROSION CONTROL

Guy Williams

From preceding page

lems. The many benefits that companies reap from these activities make dollars invested in corporate NACE memberships perhaps the most productive dollars they can invest in fighting corrosion.

Future Outlook Bright

Despite the present tremendous cost of corrosion to the chemical processing industries, the outlook for further reducing corrosion costs is bright. Continuing research on the mechanisms of corrosion, proper selection of materials used in corrosive environments, improved equipment fabrication methods, new coating materials, and other methods of controlling corrosion are effectively reducing corrosion losses. It is a good omen that each year has seen new advances made in corrosion control techniques and knowledge. Certainly we can expect continued, united efforts to reduce constantly the costly and wasteful damage caused by the many types of corrosion that strike the chemical processing industries.

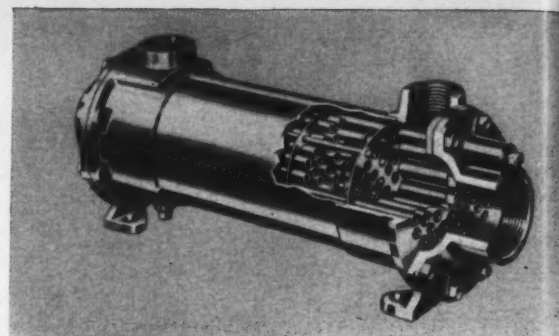
Tungsten carbide

. . . in two new grades is now available. One grade (K601) is binder-free composition, which is resistant to chemical attack, such as that of boiling sulfuric acid. It has minimum density of 15.3 g/cc; Rockwell A hardness of 94.5; and transverse rupture strength of 100,000 psi. It resists deformation up to 2500°F and/or 10,000 psi.

Second grade (K701) was designed for use under less severely corrosive and abrasive conditions. It has density of 14.0 g/cc; hardness of 92.5 Rockwell A; transverse rupture strength of 150,000 psi.

(K601 and K701 Tungsten carbides are product of Kennametal Inc., Latrobe, Pa.)

Check 2753 opposite last page.



QUALITY YOU CAN MEASURE . . .

Republic ELECTRUNITE Stainless Steel Heat Exchanger Tubes

Republic ELECTRUNITE® Stainless Steel Heat Exchanger Tubes offer you positive installation, operation, and service qualities. *Quality* has been measured! A full series of production checks, to the applicable specification, include such manipulation tests as crushing, flanging, flaring, flattening, and bend-back. Every length is fully solution annealed and hydrostatically or electronically tested by FARROWTEST®, Republic's exclusive accepted production test that detects and rejects irregularities of critical, measurable size. Send for FREE brochure, STP-1.



REPUBLIC STEEL

STEEL AND TUBES DIVISION
207 East 131st Street • Cleveland 8, Ohio



Check 2754 opposite last page

PROTECTION PLUS!

END MAINTENANCE PROBLEMS FAST

WITH

CHARCOTE

NEOPRENE RUBBER-COATING

Protects Against:

CORROSIVE FUMES
SUNLIGHT AND HEAT

WEATHERING — ABRASION
MOISTURE — SALT SPRAY

CHARCOTE is not a rubber base paint. You do not "paint" surfaces . . . you actually rubber-coat them with protection!

CHARCOTE can be brushed on, rolled on, sprayed or used as a dip. Available in standard industrial colors including aluminum, red, black, green and grey; and in quart, gallon, five-gallon and drum containers.

CHARCOTE air-dries and air-cures to a tough, pliable, rustproofing and waterproofing film of neoprene rubber, and has its built-in primer.



Tougher Than The Metal Itself

JOBBER INQUIRIES INVITED



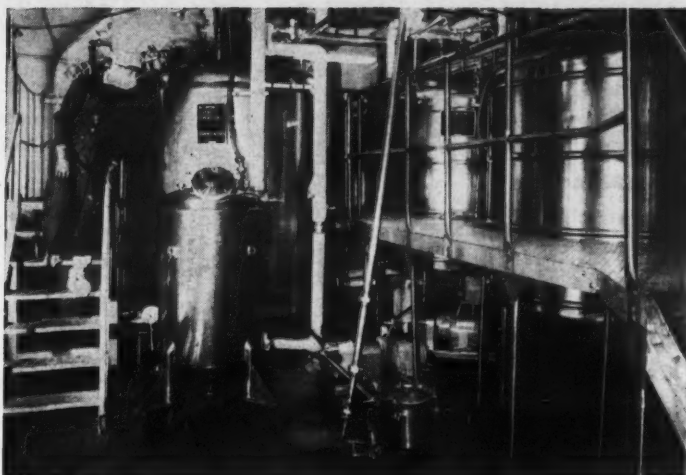
Write For Descriptive Charcote Folder

CHARLESTON RUBBER CO.

28 STARK IND. PARK CHARLESTON, S.C.

Check 2755 opposite last page

CHEMICAL PROCESSING



CHEMICAL
PROCESSING

CORROSION CONTROL
... 6th Annual Feature

Operator inspects stainless tank at Pfizer. Stainless piping and fittings carry solutions from here to filling area. Note stainless guard rails

Stainless Protects Pfizer Products, Pays For Itself In One Year

Additional cost amortized by savings in maintenance. Besides tubing, pipe, and processing vessels, stainless is used for guard rails and shields to eliminate another source of possible contamination

An example of the increasing use of stainless steel in the chemical processing industries is found in the Brooklyn, N.Y., plant of Chas. Pfizer and Co., Inc.

Besides product purity, a major benefit to Pfizer is the reduction in maintenance costs due to stainless. Additional cost of stainless is repaid within a year due to savings in maintenance, labor, equipment downtime, and elimination of painting.

In the production of pharmaceuticals, stainless steel is used extensively for processing and packaging equipment. Stainless is employed because of its well-known properties of strength, corrosion resistance, and cleanability.

Most important use of stainless at Pfizer is for liquid product transfer lines connecting processing area, storage tanks, and packaging department. Material can be moved inside these lines without any chance of contamination from air or piping itself.

Type 316 tubing and pipe

are used at the plant. Surfaces are mechanically finished to remove imperfections on outside and inside walls. This eliminates all surface recesses in which bacteria could accumulate or where traces of a product could become lodged, causing contamination of a later batch.

Transfer lines are equipped with stainless couplings which

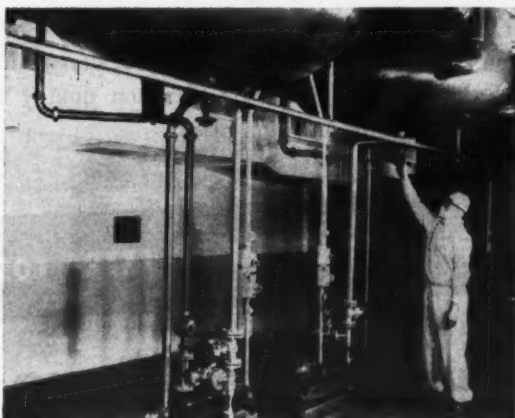
are easily disassembled for sterilization between batches. Couplings are fitted at convenient lengths for easy handling.

Safety program at Pfizer has found use for sheet stainless as guards for gears, conveyors, and power trains. Protective railings are made from stainless tubing. Supporting roof columns are

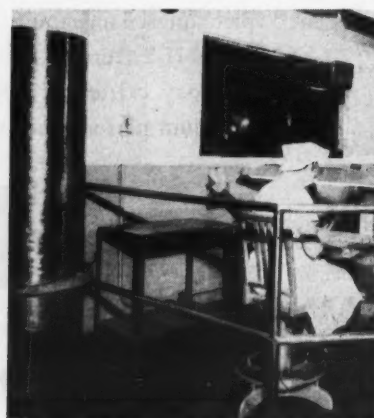
sheathed to a height of six feet from floor. Reason stainless is used for these applications is to guard against possible contamination from corroded metal or paint chipping.

(Type 316 stainless pipe and tube are products of Alloy Tube Div., The Carpenter Steel Co., Reading, Pa.)

Check 2756 opposite last page.



Product in tanks is pumped through full-finished stainless tubing



Note use of stainless on column at left and on guard rails in Sterajet area

A GREAT NEW IDEA BEARING SEALS of TEFLON®



A brand new idea in bearing seals is another Durco first. This amazingly simple device is leakproof and foolproof. Bearing life will no longer be shortened by splashed or spilled acids, and lubricant is positively sealed in.

These new bearing seals are just another one of the extras Durco gives you as standard. Large, solid, rugged shafts; heavy duty, long-life bearings; complete interchangeability with minimum parts inventory; these are standard with Series H-2 Durcopumps. They're extras on other chemical pumps; extras that you pay extra for. Series H Durcopumps give you premium quality and premium performance without the sting of premium price.



The mark of dependability in tough chemical service... everywhere

THE DURIRON COMPANY, INC., DAYTON, OHIO

Check 2757 opposite last page

Teflon is the registered trade-mark of E. I. duPont de Nemours & Co. for its tetrafluoroethylene resin.

THIS NEW FEATURE AT NO EXTRA COST

CORROSION CONTROL

Delta-ferrite is culprit in evaporator-tube corrosion failure

Problem: Welded tube, in first effect of evaporator series at plant of Canadian International Paper Company in LaTuque, Quebec, Canada, were rendered useless by corrosion in one year. ID weld bead of tube had been eroded to depth of approximately 30 mils. No such difficulty was experienced with tube in second effect during same period.

In each effect, approximately 30 tons of 2" OD x 0.058" minimum-wall Type 304 tube



Magnification of approximately 25 X illustrates degree of corrosion-erosion at weld of tube used in first effect of evaporator series. Lack of recrystallization is indicated by cast appearance of weld and irregular grain size adjacent to weld in heat-affected zone

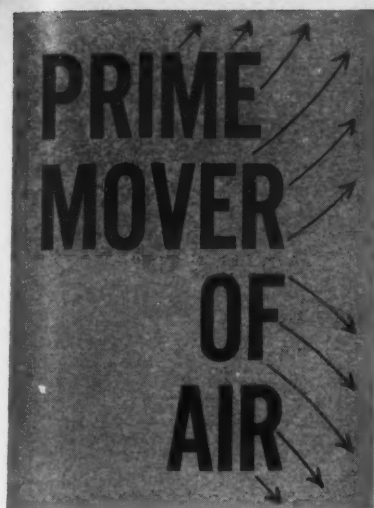
was in service. Operation took place in sulfite liquor at 60 psig and 300°F.

Tube in first effect was manufactured by welding, swaging, and annealing. That of second effect was produced by welding, annealing, and drawing operations.

Solution: Micro-examination of weld area of corroded tube indicated approximately 5 to 10% delta-ferrite in austenite matrix. Grain structure did not indicate recrystallization. Magne-gage readings verified presence of delta-ferrite in weld. X-ray diffraction studies were made to determine exact % of ferrite present. Results indicated presence of 5.58% delta-ferrite.

Micrometer readings of wall thickness of tube outside weld area were 0.061", indicating negligible corrosion loss on fully austenitic base metal.

Tube samples from second



Aeromaster



higher efficiency

lower operating costs

Aeromaster Fans move *hot* air more efficiently by delivering *more* CFM and requiring less horsepower. Adjustable pitch heat-treated aluminum alloy blades have excellent corrosion-resistance qualities. Used in refineries, gas transmission stations, steel mills and industrial plants for major heat transfer systems. 4 to 6 blade fans available 54" to 22' diameters. For more details on fans that cost less to install, operate and maintain, write: KOPPERS COMPANY, INC., 8306 Scott St., Baltimore 3, Md.



Aeromaster Fans

Engineered Products Sold with Service

Check 2758 opposite last page

JULY 1959

CORROSION CONTROL

effect were examined by means of Magne gage and X-ray diffraction. Tests indicated no differential between weld and parent metal.

Results: Wall-thickness measurements and micro-examination indicated that Type 304 is satisfactory to withstand operating conditions of evaporator, provided proper processing and fabrications are carried out.

As welded, Type 304 generally contains from 4 to 10% delta-ferrite in weld metal. Tube must be cold-drawn and annealed a certain amount, in order to eliminate delta-ferrite. Cold-swaging and annealing does not provide degree of cold work and anneal necessary to eliminate delta-ferrite in weld and to effect full recrystallization.

Delta-ferrite will corrode preferentially due to its much higher solution potential than austenite.

Unless delta-ferrite is eliminated, behavior of such tubes in any corrosive environment will be poorer than if delta ferrite were removed. This may even result in accelerated failure in such applications as encountered in sulfite liquor of paper industry.

(Type 304 welded tube, as successfully used in second effect in evaporator series, is product of The Wallingford Steel Co., Wallingford, Conn.)

Check 2759 opposite last page.

Liquid-rubber coating foils hot caustics

Problem: A New England chemical company found that various types exterior coatings for tank trucks were unable to withstand constant spillage of hot liquid caustic.

Solution: A liquid synthetic-rubber coating was utilized.

Results: Coating has successfully withstood hot-liquid caustic spillage.

(Rubber-coat liquid Hypalon is product of The Wilbur & Williams Company, Inc., 650 Pleasant St., Norwood, Mass.)

Check 2760 opposite last page.

THE "JOB PROVED" ANSWER TO PLUGGED UP VALVES in CORROSIVE and ABRASIVE SERVICE

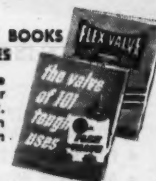


- Non-clogging
- Corrosion-resistant
- Full pipe capacity
- Absorbs vibration
- Low replacement costs
- No freeze-up in outdoor service
- No obstructions, pockets or internal parts
- Tight on grits to 1/4"
- Maintenance free

Case histories show batteries of Farris FLEX VALVES in severe corrosive and abrasive service for more than 25 years — far surpassing metal valves in efficiency and reliability. FLEX VALVE is the original pinch-type valve, built by Farris to meet industry's need for tough service. FLEX VALVE, in effect, is an integral part of your process piping. Clean FLEX VALVE when pipes are cleaned — the same way! Whether your material is corrosive chemicals, solids in suspension or even wet cement... FLEX VALVE cannot plug! Wide choice of flexible valve bodies for every process need. Manual or motor-operated types and Metal enclosed SuperSeal designs for higher pressures, hazardous service.

FREE TWO VALUABLE BOOKS ON FLEX VALVES

Complete catalog data on the FLEX VALVE line is yours for the asking. Request FL-1116R. Hundreds of uses are listed in FL-933. Also available on request.



GUARANTEED NOT TO PLUG OR YOUR MONEY BACK!

Over 25 Years in Industry's Toughest Service
FLEXIBLE VALVE CORP.

505 COMMERCIAL AVENUE, PALISADES PARK, N. J.
TEXAS FACTORY: 5405 CLINTON DRIVE, HOUSTON 20.

• FARRIS PICKERING GOVERNOR CO., INC. • FARRIS ENGINEERING, LTD. (England)
Representatives in All Principal Cities

Check 2761 opposite last page



Piping corrosion problem in handling 25% sulfuric acid has been solved with this UPVC system, equipped with **thp** fittings and flanges. In Baltimore plant of The Glidden Company.

How you can stop piping corrosion



Complete information on UPVC (unplasticized polyvinyl chloride) piping to aid in design and installation given in Catalog 119. Also describes full line of **thp** products . . . fittings, flanges, valves, specialties. Free on request.



TUBE TURNS PLASTICS, INC.

DEPT. CP-7, 2929 MAGAZINE STREET

Louisville 11, Kentucky

Check 2931 opposite last page



METERING PUMPS

- STAINLESS STEEL — OILLESS BEARINGS — STERILIZABLE
- POSITIVE DISPLACEMENT — SMOOTH, NON-PULSATING FLOW
- FOR HOT, COLD, VISCOUS OR WATERY FLUIDS
- ACCURATE WITHIN 1 TO 2%

Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glue, processing solutions, etc. Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Write for complete details and prices.

MECHANICAL PRODUCTS CORPORATION

1722 West Hubbard Street • Chicago 22, Illinois

Check 2932 opposite last page

CHEMICAL
PROCESSING

CORROSION CONTROL
... 6th Annual Feature

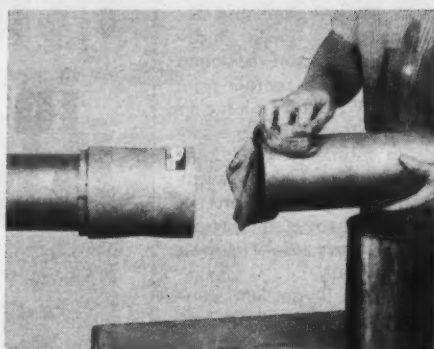


Fig 1 — Oil, grease, dirt and other foreign materials are removed from surfaces before bonding

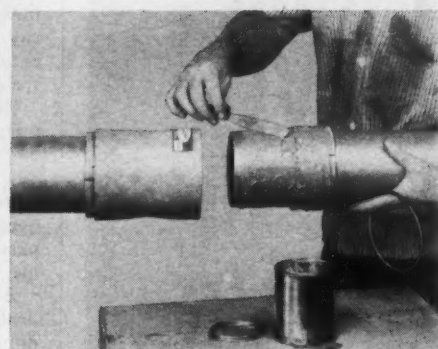


Fig 2 — Locking wedge is slid over pipe and covered with epoxy adhesive. O-ring goes on pipe end

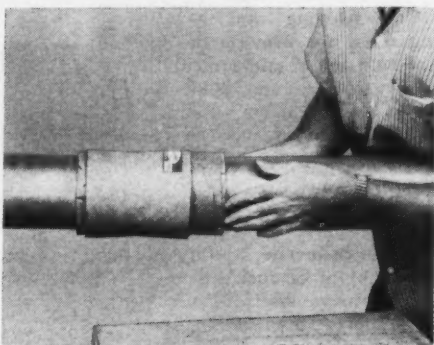


Fig 3 — Pipe is inserted into fitting and pressed firmly so that end of pipe contacts bottom of socket

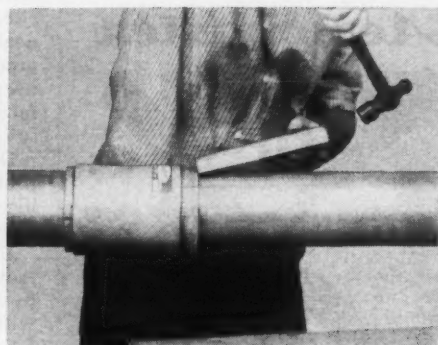


Fig 4 — Locking wedge is driven home with block of wood and hammer. O-ring is automatically seated and sealed

Providing a joint that can be quickly made without special tools —

Fittings broaden application of reinforced plastic pipe

Plastic pipe — made of epoxy resin reinforced with glass fibers — is expected to have wider use with recently developed locking-wedge fittings now available. Fittings, as shown in photographs, provide a joint that does not leak and can stand immediate handling. No special tools are required.

These locking-wedge fittings are used for plain-end reinforced plastic pipe. Fittings available include 90° and 45° elbows, tees, and couplings. Ductile iron fittings with locking wedge are also in stock. These are designed so that material being transferred cannot contact iron.

Under test and soon to be released are flanged and Victaulic-type fittings. These are expected to prove useful where

make-and-break connections are desired. Fittings and pipe are presently available with threads, which are sealed against leakage with a special thread compound.

Reinforced epoxy resin pipe is resistant to a wide variety of highly corrosive chemical products. Another factor that should broaden use of the Bondstrand pipe is its availability in sizes from 2 up to 8" in diameter, with larger sizes furnished on special order.

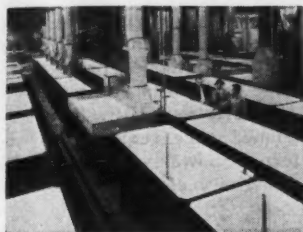
(Bondstrand pipe and fittings are product of Amercoat Corp., Subs. of American Pipe & Construction Co., 4809 Firestone Blvd., South Gate, California.)

Check 2763 opposite last page.

CORROSION CONTROL

Plating plant protection provided by PVC sheet

In order to forestall corrosion, polyvinyl chloride sheet is being used to protect tanks, and was utilized in construc-



In recently completed plating plant, 135 tanks were lined and covered with flexible PVC sheet

tion of hoods and duct work, at plating plant of McClellan Air Force Base, Sacramento, California.

In plant, which went on stream in June, flexible PVC sheet was used to line and cover 135 tanks. Necessary hoods and duct work were fabricated from high-impact rigid PVC sheet. Plating solutions being used include a variety of corrosive acids. Cleaning solutions must also be withstood.

(Flexible Koroseal sheet and high-impact rigid Koroseal sheet are products of B. F. Goodrich Industrial Products Company, Marietta, Ohio.)

Check 2764 opposite last page.

Corrosives at 200°F resisted by lining

Uses: Protection against mechanical damage in transit and construction, and corrosion.

Features: Lining is suitable for service to 200°F.

Description: Rubber lining compound is natural crude rubber, modified with synthetic elastomers and synthetic plastics. It resists most inorganic and a large number of organic chemicals.

(Compound RH-68 is product of La Favorite Rubber Manufacturing Co., 275 Wagaraw Rd., Hawthorne, N.J.)

Check 2765 opposite last page.

IN THE SPOTS THAT COUNT!



Goodyear specifies Homestead Valves for non-contamination of GR-S latex rubber



Homestead lubricated plug valves handling latex rubber.

Through the round ports of Homestead Lubricated Plug Valves at Goodyear Tire and Rubber Company's synthetic rubber plant in Houston, Texas, flow dilute solutions of GR-S latex rubber at 80 p.s.i. and 100° F.

Fluid solutions never lodge and build up in the line since Homestead Round Port Valves provide full circular opening through plug and body of the valve—same size as the pipe they serve.

Controlled pressurized lubrication plus extremely close tolerances between plug and body assure lubrication of all sealing surfaces without contamination of line fluids.

Write for complete details on low first cost, low maintenance, Homestead Valves in our catalog 39-1.



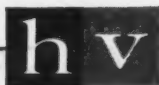
☐ Please send me catalog and prices on Homestead Lubricated Plug Valves.

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....



HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. Box 140, Coraopolis, Pennsylvania

Check 2766 opposite last page

Maintenance Cost Too High?

How much
does
this
cost you
every year?

How much time, effort, and money is spent cleaning, resurfacing and/or replacing flanges to replace the seal!

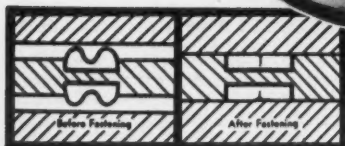
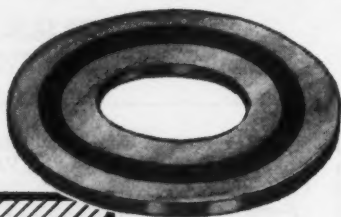
Expensive? Yes!

Why not find out about Gask-O-Seals and save! Here are the facts: With Gask-O-Seal, flange

faces require little or no cleaning or resurfacing of flanges when replacing the seal — and Gask-O-Seals are re-usable.

Gask-O-Seals save money and effort in many other ways, too. They are visually inspectable, do not need to be re-torqued, there is no material creep and they are non-directional, non-flexible, easy to install. They provide no-leakage sealing, can not blow out, and there is no wear due to pulse.

Now available to fit ASA standard flanges. Write for free catalog.



Note metal to metal contact.

Parker SEAL COMPANY
CULVER CITY, CALIFORNIA and CLEVELAND, OHIO
A DIVISION OF PARKER-HANNIFIN CORPORATION

Check 2767 opposite last page

CORROSION CONTROL

Field corrosion inspection with lightweight, portable unit

Uses: Non-destructive thickness measurement of most metals, glass, ceramics, and plastics from one side.

Features: Portable unit weighs less than five lb. This includes batteries, probe, harness, cable, and earphones.

Description: Ultrasonic resonance gage requires no external power source. High-sensitivity ceramic transducer

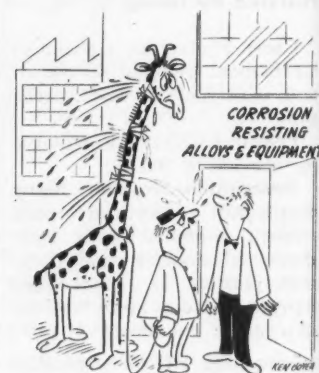


Portable corrosion meter is suitable for field surveys

is applied to one surface of material under test. Instrument indicates harmonic resonances by an audible signal and indicator deflection.

(Model 6 Audiogage® is product of Branson Instruments, Inc., 40 Brown House Rd., Stamford, Conn.)

Check 2768 opposite last page.



"Whom do I see for quick service?"

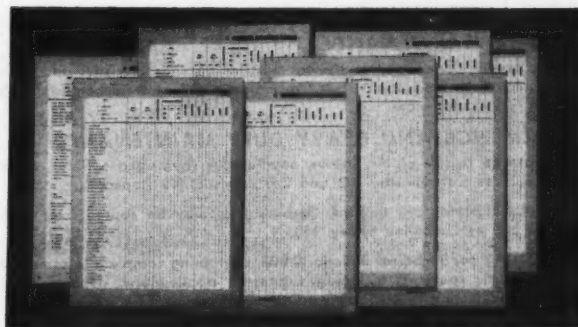
Now you can predict service life because Byers PVC Pipe Engineering brings a factual approach to piping system design

FACT: 400 corrosion resistance ratings are available for Byers PVC Pipe

The ability of Byers PVC Pipe to handle various corrosive media is down in black and white. There are a number of tables available from Byers Engineering Service Department listing corrosion resistance ratings. Actual laboratory tests helped to determine these ratings. And we present them on a comparative basis with several metallic pipe materials.

Since ratings appear only for 72°F and 140°F, these tables do not show all applicable ranges for Byers PVC Pipe. So if applications arise where you need more information, at a specific temperature and concentration, check with us.

Remember—as in metals—concentration, temperatures and stress influence corrosion rates of PVC. Type I PVC displays considerably greater corrosion resistance than Type II, which is best where high impact resistance is the prime consideration. More of this story is available from the Byers field service representative. Call him, soon. **A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.**



Resistance ratings are divided into four categories: E for excellent, G for good, L for limited, and U for unsatisfactory. In applications where PVC is rated as "good" and "limited" it will still display considerable resistance, in most cases higher than that of metal pipe materials.



BYERS PVC PIPE

ALSO SHEET AND ROD STOCK

Check 2769 opposite last page

Write our Engineering Service Department for copy of this new 32-page illustrated catalog on Byers PVC Pipe.





with **CARBOMASTIC** heavy duty epoxy-tar coatings

Generally, with protective coatings, undercutting begins at a damaged surface and corrosion progresses beneath the coating film. This corrosive loss can be prevented by priming with Carbomastic #3—unique because it contains inhibiting pigments. In addition, it features good surface wetting and outstanding adhesion.

These tough coatings are economical, too . . . providing lasting protection for less than 1¢ per mil foot. Recommended Carbomastic applications are:

OUTDOOR MAINTENANCE

An all epoxy-tar system, with excellent weathering characteristics and high resistance to water and brines. Use Carbomastic #3 and Carbomastic #5 (topcoat). Color: aluminum.

TANK LININGS AND HEAVY DUTY MAINTENANCE

High resistance to hot water, brines, sour crudes (hydrogen sulfide), acids and alkalis. Use Carbomastic #3 and Carbomastic #2 (topcoat).

Where color topcoats are desired, Carbomastics may be coated over with Phenoline 305 or Carboline Epoxy 150.

WRITE TODAY for Technical Bulletin #803, containing complete information on Carbomastic coatings, including suggested applications, general characteristics and testing results.

OFFICES

Atlanta • Boston • Chicago
Denver • Detroit • Houston • Los Angeles
Mobile • New Orleans
New York • Philadelphia
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Tampa • Toronto • Tulsa

carboline
C O M P A N Y

32-B Hanley Industrial Ct.
ST. LOUIS, MISSOURI

Coatings with
Experience

Check 2770 opposite last page

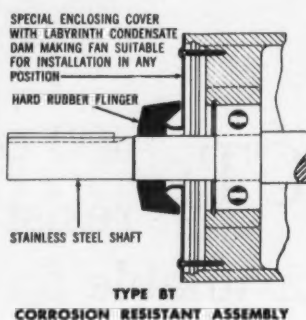
CORROSION CONTROL

Corrosion-resistant fans

Uses: For use in extensive duct systems. Pressure-type propellers are used where system resistance is high. Fans can also be used in roof ventilators.

Features: Fan is specifically designed to handle corrosive and explosive fumes, high temperatures, and similar difficult exhaust problems.

Description: Die-formed rubber flinger is mounted on the stainless steel fan shaft; combined with the formed



cover plate, it creates an effective labyrinth shaft seal making the fan suitable for operation in any position.

Cast aluminum-magnesium alloy propeller and interior fan surfaces may be coated with polyvinyl chloride, phenolic resin, or other coatings suitable to the installation.

Size of fans now ranges from 16 to 60 inch sizes with air deliveries to 85,000 cfm.

(Type BT tubeaxial fan is product of Propellair Div., Robbins & Myers, Inc., Springfield, Ohio.)

Check 2771 opposite last page.

Teflon lab containers

. . . manufactured by process permitting fabrication of thin-wall models in cylindrical or spherical form. Examples of corrosion-resistant laboratory ware are beakers, watch glasses, and containers.

(Thin-wall Teflon lab containers are product of W. S. Shamban & Company, Box 1037, Culver City, Calif.)

Check 2772 opposite last page.



PERMANITE® Solvent, Alkali, Acid-Proof **MORTAR**

for tile, brick floors;
lining tanks, towers

PERMANITE Mortar is a furan resin manufactured by the Maurice A. Knight Company. It is ideal for use with tile or brick in floors, lining of tanks, towers and chemical processing equipment. It sets up at ordinary temperatures in one to two hours and makes a dense, non-porous joint.

PERMANITE Mortar is resistant to most inorganic acids, organic acids, alkalies of all concentrations, oils, grease, solvents, water and steam at temperatures up to 380°F. It is not suitable for nitric or strong sulphuric acid. Permanite powder and solution have no harmful effect on the skin and are non-inflammable. *Write for our bulletin No. 4-D.*

Knight also has other mortars to meet almost any combination of service conditions—Acidsil, silicate base; Knight-bond, plasticized sulphur base; and Kabo, phenolic resin base.

Maurice A. Knight

**Acid and Alkali-Proof
Chemical Equipment**

**4 Kelly Ave.
AKRON 9, OHIO**

Check 2773 opposite last page

CHEMICAL PROCESSING

THAT'S INTERESTING

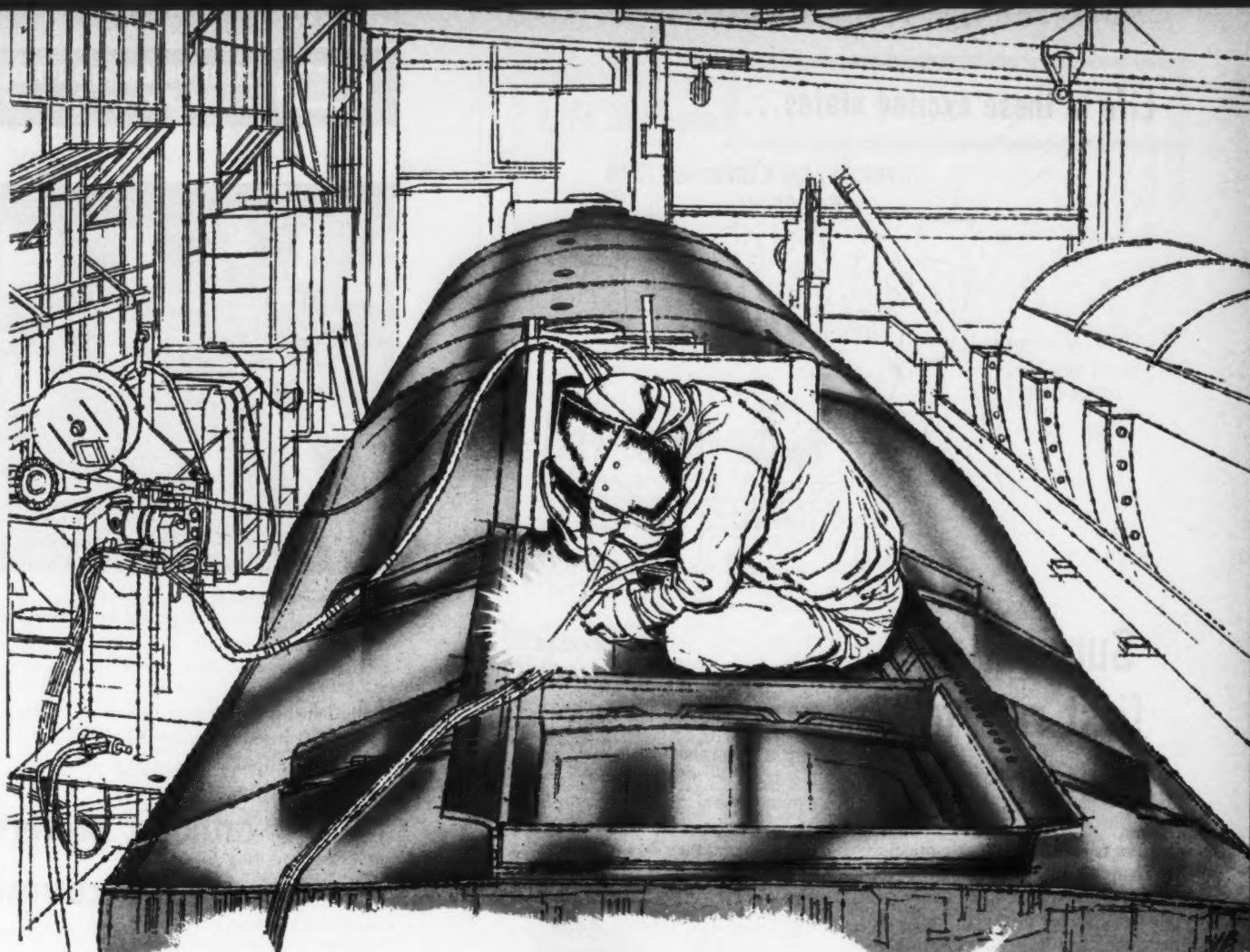
Super load

Two locomotives and 14 flatcars were required to move steel sections of what will be the largest rotary kiln in North America. Overall shipment weighed 685 tons; the largest section weighed 67 tons. Two railroads, a lake vessel, and trucks co-operated in job of moving sections from Chicago Bridge & Iron Co.'s plant at Greenville, Pa., to Dundee Cement Co., Dundee, Mich.

Fire protection

Dow Chemical Co. is using a grease-like silicone compound on line insulators to protect them and prevent fires and flashovers in 2300 and 13,800 v lines. Industrial Research Newsletter of Armour Research Foundation reports protection has lasted as long as three years.

For more information on product at right, specify 2774 see information request blank opposite last page.



Formula for Success

The formulation of a stainless steel alloy requires as much precision as any chemical compound. All the care exercised in the selection of a particular alloy can be nullified by variations in the analysis specified.

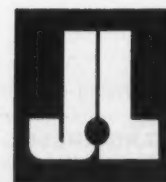
During fabrication, for example, slight differences in chromium-nickel: carbon ratios can cause changes in microstructure which lead to early failure.

That's why it is safer to specify J&L Consistent Quality Stainless Steel. J&L leads the industry in melt shop standards for stainless steel—the point where quality starts, and longer service life begins.



Plants and Service Centers:

Los Angeles • Kenilworth (N. J.) • Youngstown • Louisville (Ohio) • Indianapolis • Detroit



STAINLESS
SHEET • STRIP • BAR • WIRE

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Box 4606, Detroit 34

Life in these excited states...

CORROSION CONTROL LABORATORY

"This, gentlemen,
is all that is left
of Plant 'B' "



Survival ... first rule for plastic pipe

Passive resistance... that's plastic's survival technique under the onslaught of corrosive chemicals. Ace plastic pipe, for instance: inert, impervious, age-less... while metals and lesser materials dissolve and crumble. Best for the money anywhere... backed by 108 years' experience.

All-purpose rigid PVC. Sched. 40, 80 & 120, 1/2 to 4". Threaded or socket-weld fittings. Valves 1/2 to 2". NSF-approved. Bul. CE-56.

RIVICLOR
for ageless strength



Improved design... now 12 gpm. All wetted parts acid-resistant, wear-resistant Ace hard rubber. Finest available. Bul. CE-55.

**NEW
ACE Gear Pump**



Flexible poly pipe, ideal for water lines, drains, underground pipe or conduit. Sizes 1/2 to 2", long coils, NSF-approved for drinking water. Bul. CE-57.

SUPPLEX
lays in economy



World's best chemical valves... at moderate prices. All-plastic, rubber-lined, or all-hard-rubber. 1/2" pet cocks to 24" gate valves.

**VALVE
HEADQUARTERS**



ACE

processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey



Check 2775 opposite last page

CHEMICAL
PROCESSING

CORROSION CONTROL
... 6th Annual Feature



Biron installation showing some of leads which distribute current to anodes suspended below surface of water

Using impressed current system to protect steel water-treating equipment in three different divisions of company —

cathodic protection controls corrosion

GORDON WEYERMULLER
Associate Editor

with **OTTO MITTELSTEADT**
Chemical Process Engineer
Consolidated Water Power
& Paper Company
Wisconsin Rapids, Wis.

representative of the other two, it will be described.

At Biron a 70 x 70' Accelerator unit is used for processing the raw river water at the rate of eight million gallons per day. Water-treating unit has outer walls of concrete. Inner mechanism and structures are made of mild steel.

Raw water is clarified by an alum-silica flocculation in which the pH varies from 5.2 to 6.0. Raw water is introduced into agitated center section of water-treating unit and mixed with chemicals and previously flocculated impurities. Clear water then separates from mixture in outer area and is decanted while floc returns to center section. Excess floc is concentrated and withdrawn. Purified water is filtered and stored.

Solution: A cathodic protection system was installed for water-treating unit con-

Problem: Former coatings on Accelerator® units used for treating raw river water at three different plants of Consolidated Water Power & Paper Co. lasted only about two years. Comparatively short life of coatings and long drying time for reapplication of coatings required scheduled downtime in the filter plant. In spite of these measures, some of steel on equipment was found to be pitting.

Accelerator units for treating water are being used at all three divisions — Biron, Wisconsin Rapids, and Appleton. Since the Biron installation is

CORROSION CONTROL

sisting of two electrical circuits. Each circuit has a rectifier converting 110 volts AC to DC. Each circuit uses a distribution lead system to high-silicon cast iron anodes which are suspended at varying heights below the surface. Inner mechanism and structures are coated with a red lead paint.

At the Wisconsin Rapids installation, like the Biron, all anodes are high-silicon cast iron. Appleton unit uses silicon iron anodes under the hood, with aluminum anodes in draft tube and outside the hood.

Results: No repair work or painting has been required on any of the three water-treating plants since installation of the cathodic protection systems. No pitting or corrosion has occurred. Installation at Biron was made in 1956 — one at Wisconsin Rapids in 1957 — and one at Appleton in 1952.

(Cathodic protection systems were designed and installed by Electro Rust-Proofing Corp., 30 Main St., Belleville 9, New Jersey.)

Check 2776 opposite last page.

(For further information on Accelerator water-treating units contact Infilco Incorporated, P.O. Box 5033, Tucson, Arizona.)

Check 2777 opposite last page.

Variety of corrosives handled by nickel alloy containing titanium

A nickel-iron-chromium alloy containing titanium, has been developed which will handle a wide variety of corrosive solutions, some of unusual severity. Approximate chemical analysis of alloy, called Ni-o-nel, is as follows:

	Percent
Nickel	42.00
Chromium	21.50
Molybdenum	3.00
Copper	2.25
Manganese	1.00 max
Silicon	0.50 max
Sulfur	0.03 max
Carbon	0.05 max
Titanium	0.6-1.2
Iron	Balance

Relatively high nickel content of alloy plus molybdenum and copper make the alloy resistant to reducing conditions, such as sulfuric and phosphoric acid solutions. Chromium content is sufficient so that when fortified with nickel, the alloy is resistant to a variety of oxidizing chemicals such as nitric acid solutions, nitrates and cupric, ferric and mercuric salts except chlorides. With this combination of properties, alloy finds useful application in a broad range of corrosives, some involving mixed acids and mixtures of oxidizing and reducing chemicals.

Nickel content of alloy is sufficient to make it resistant to stress corrosion cracking in chloride-containing environments. It has shown freedom from cracking in such applications as tubular heat exchangers involving hot chloride-containing waters, and trays of boiler feedwater deaerator heaters.

Alloy is stabilized by addition of titanium and by its relatively low carbon content.

Many of the successful applications are in the handling of sulfuric acid solutions in a variety of processes where few other materials have adequate corrosion resistance. Alloy is usefully resistant to pure phosphoric acid solutions at all concentrations and temperatures up to and including boiling 85% H_3PO_4 .

Ni-o-nel is highly resistant to most of the organic acids including boiling concentrated acetic acid, acetic-formic acid mixtures, maleic and phthalic acids which frequently are corrosive to many other materials. Under flowing conditions alloy has a very satisfactory resistance to sea water.

Alloy will withstand most alkali solutions although its resistance to hot concentrated sodium hydroxide and potassium hydroxide is usually not as good as that of nickel metal itself.

(Ni-o-nel alloy is development of The International Nickel Company, Incorporated, 67 Wall Street, New York 5, New York.)

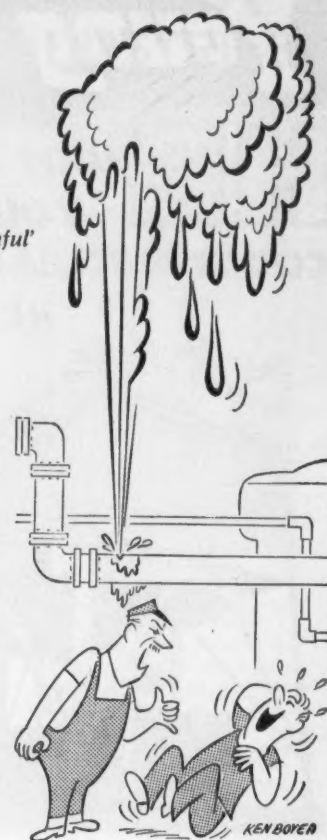
Check 2778 opposite last page.

Life in these excited states ...

"Stop saying
'There goes Old Faithful'
and get it fixed!"

What to do when corrosion sends costs sky high

No one can afford ruined equipment, endless repairs, and plant shut-downs caused by corrosion. And you *shouldn't* afford over-design and too-fancy equipment. Ace takes you right down the middle... a wide choice of chemical-resistant pipe, pumps, valves, tanks, etc. Best for the money anywhere... backed by 108 years' experience.



TEMPRON for hot jobs



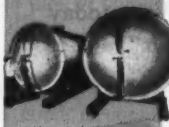
Best non-metallic pipe anywhere for hot chemicals to 275°F. Also handles tough organics. Rigid, tough nitrile. Pipe and fittings to 8". Bul. 96A.

ACE-FLEX... sparkling clear



1001 uses. Non-toxic, odorless, tasteless, sterilizable, flexible tubing. Excellent for chemicals, foods, and for lab or machine lines. 1/4 to 1 1/4". Bul. 66.

"BONDED STORAGE" for corrosives



Heavy Ace rubber and plastic tank linings unexcelled for alkalis, acids, bleaches, salts. Faultless seams, indestructible bond, shock and age-resistant. All shapes. Bul. CE-53.

DO-IT-YOURSELF PLASTICS



Special equipment often can be machined, punched or welded of standard plastic or hard rubber sheet, rod or tubing. Write for details today.

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY

DIVISION OF AMERACE CORPORATION

Ace Road • Butler, New Jersey

ACE



Check 2779 opposite last page

Young helps tame the ATOM...

HC UNIT BY
YOUNG
**COOLS NUCLEAR TEST
REACTOR**



This Stainless Steel Horizontal Atmospheric Cooler by Young at Knolls Atomic Power Laboratory is specially engineered and fabricated for cooling water used in the nuclear proof test reactor.

YOUNG engineers specially designed this atmospheric cooler to comply with the rigid specifications set by the A.E.C. The first nuclear test reactor duplicating temperature and pressure conditions of a full scale pressurized water power reactor has been placed in operation by General Electric at Knolls Atomic Power Laboratory (KAPL). A stainless steel horizontal atmospheric cooler by Young cools reactor water which reaches temperatures of 550F. and pressures up to 1250 psi.

The unusual is routine for Young's team of Heat Transfer experts. Their Design, Engineering and Fabrication ability are part of *your* staff when you call upon Young. Write today for assistance with your current or anticipated Heat Transfer requirements. No obligation, of course.

write for **FREE** catalog...

Young RADIATOR COMPANY
RACINE, WISCONSIN
Creative HEAT TRANSFER ENGINEERS
Executive Office: Racine, Wisconsin; Plants at Racine, Wisconsin, Matteson, Illinois



Write Dept. 379-G
for Catalog No. 557

Check 2780 opposite last page

CORROSION CONTROL

**X-ray diffraction device
helps answer water
treatment problems**

Problems of corrosion, scaling, embrittlement, and other ills that boiler tubes and allied piping fall heir to are constantly being studied at Allis-Chalmers.

Of the many types of research equipment used to analyze steam-water cycle deposits, an X-ray diffraction device is singled out as an increasingly important tool. It identifies crystalline com-



X-ray analysis unit in operation
at Allis-Chalmers

pounds by specific patterns formed when X-rays are reflected off crystal surfaces. Each crystalline compound has its own unique X-ray pattern.

A sample is removed from a plugged tube, X-rayed, and the resulting negative is compared with existing patterns to determine compound structure. Corrective action, through use of A-C water treating equipment or chemicals, can then be recommended.

Company research facilities also include a complete chemical analysis system to determine the relative amounts of individual elements in a deposit. In addition, instruments such as the spectrophotometer, flame photometer, polarograph, petrographic, biological, and metallurgical microscopes, diffraction apparatus and spectrograph equipment are available for complete identification and analysis work.

With this equipment, analysis of many organic and inorganic compounds, including silica, phosphates, sodium, potassium, zinc, aluminum and ferric salts can be carried out

Which Water Treating Equipment Will Best Fit the Job?



BULLETIN
615

*This new 24-page bulletin
will help you decide*

See what it covers:

- Zeolite Water Softeners
- Demineralizers
- Dealkalizers
- Deionizers
- Filters
- Purifiers
- Degasitors
- Deaerating Heaters
- Water Treating Chemicals

If you are confused about the many ways to treat water, this new bulletin will help you decide which is best for the job. It describes the various equipment used in treating water and what each is designed to do. Known for quality, dependability and advanced design, this equipment is based upon 50 years experience. For practical guidance in its proper application, the services of the Elgin representative nearest you is yours for the asking.

For a copy of our new booklet or to have our nearest representative contact you, simply mail the coupon.

ELGIN SOFTENER CORPORATION
180 N. Grove Ave., Elgin, Illinois
Representatives in Principal Cities

In Canada: G. F. Sterne & Sons Ltd., Brantford

- ☐ Send your new 24-page Bulletin 615.
☐ If checked, have your representative contact me.

Company Name _____

Street and Number _____

City and State _____

By _____

Mail to Elgin Softener Corporation,
180 N. Grove Ave., Elgin, Illinois

Check 2781 opposite last page

CHEMICAL PROCESSING

accurately and swiftly.

Combining research with equipment manufacture, Allis-Chalmers now offers the industry a complete package of answers to its problems with steam-water cycle deposits.

(For further information on X-ray diffraction unit, check 2782 opposite last page.)

Brine-tank hole plugs resist corrosion and lining

PVC machining rod used in plug fabrication

Problem: Users of water softening apparatus manufactured by Lindsay Company, St. Paul, Minnesota, experienced rapid build-up of corrosion and lining of metal plugs used to stop-up holes in brine tanks of softeners. Timers are mounted on outer portion of plugs.

Solution: Plugs fabricated from PVC free machining rod were utilized.

Results: Equipment checks have revealed that build-up

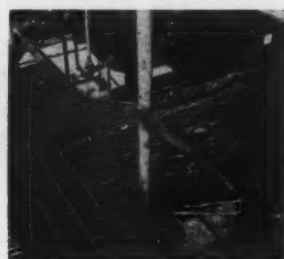


Mounting plug is manufactured from PVC rod which permits close tolerances and has minimum porosity

on, or deterioration of, plugs has not occurred after years of service. Fabricator of plugs found that PVC rod used permitted close tolerances and had minimum porosity.

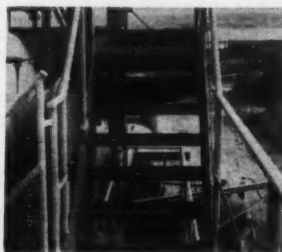
(Ryertex-Omicron PVC rod, which was used in fabrication of mounting plugs, is product of Industrial Plastics and Bearings Division, Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.)

Check 2783 opposite last page.



Grate and tread corrosion

... as shown necessitated replacement of paint-protected metal components. This problem was caused by corrosive atmosphere of chlorine and salt air at a chemical plant, and compounded by scuffing of operators shoes. This dilemma was ...



Eliminated by coating

... metal gratings and treads with vinyl plastisol, as shown on stairs. Non-skid characteristics provide safety factor.

(Unichrome vinyl plastisol is product of Metal & Thermit Corporation, 100 E. 42nd St., New York 17, New York.)

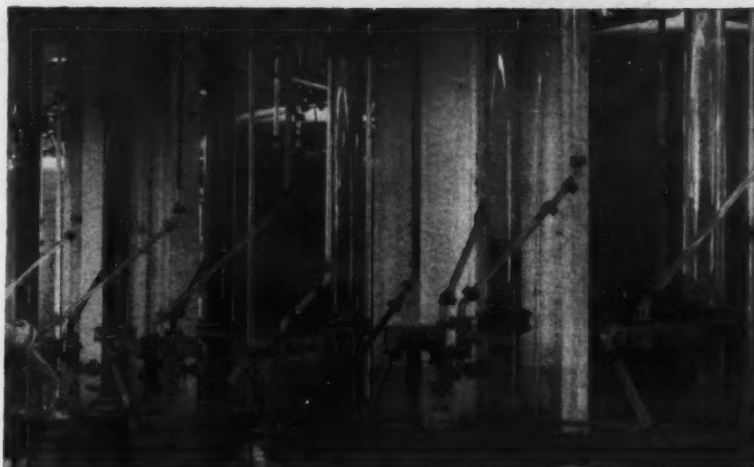
Check 2784 opp. last page.

Pumps for corrosive and slurry service are discussed in 22-page catalog. Bul 5005 — Dorr-Oliver Incorporated, Stamford, Conn. Check 2785 opposite last page.

Pipe fittings made of unplasticized polyvinyl chloride are described in brochure. "UPVC Drainage Fittings" — Tube Turns Plastics, Inc., 2929 Magazine St., Louisville 11, Kentucky.

Check 2786 opposite last page.

4 WAYS TO USE GLASS IN THE PROCESS INDUSTRIES



1. Zirconium maker uses 6-inch glass columns to get into commercial production. At the Wah Chang Corporation's Albany, Oregon, plant you'll find an extraction system made up of PYREX brand glass columns, 6 inches in diameter and 50 feet high.

Zirconyl chloride enters the open end against a countercurrent stream of thiocyanate-rich methylisobutyl ketone. After hafnium is extracted, a countercurrent hydrochloric acid stream strips out any remaining zirconium in three 6-inch by 50-foot glass columns.

Finally, zirconium-free hafnium raffinate is scrubbed with sulphuric acid in more glass columns—6 inches in diameter and 55 feet tall. The scrubbed solvent then is recycled to the extraction columns and the aqueous solution of hafnium sulfate is neutralized with ammonium hydroxide.

Why PYREX brand glass No. 7740 for this processing? Because this is the glass that stands up to corrosive fluids. It is virtually unaffected by most acids or alkalis; there is no side reaction, no pickup. And with PYREX brand glass you have no worries about heat or mechanical shock. If you would like more facts about PYREX brand glass pipe or columns, write for a copy of PE-3.

2. Heat, cool, and condense corrosive fluids in PYREX® modular shell and tube heat exchangers. Your liquid will come in contact only with PYREX brand glass No. 7740, plus a chemically resistant ceramic, and TEFLON. You'll have no worry about build-up cutting efficiency, because glass is smooth. You can design systems to use multiple units, in parallel or series-parallel flow combinations. You have

low installation costs, because units are light in weight (the 50 sq. ft. capacity model weighs only 165 pounds). Mounting brackets are supplied. You can choose from models that take corrosives on tube side only, or on both tube and shell sides. Write for the facts today.

3. No more plug-ups in glass waste-lines handling cellulose acetate dope. Problem: Design a drainline system to handle sulfuric acid, acetic acid, and a cellulose acetate effluent. Complication: when "dope" overflows into the lines, water turns the fluid into a solid acetate flake that tends to plug. The solution: 220 feet of PYREX brand pipe. No problem with corrosion. No worry about shock from steam cleaning. And if dope does build up, it's visible. You take down only those sections you need, saving a great deal of time and effort. And you discover that the visibility and ease of cleaning of glass make it possible to use smaller diameter lines than with metal. The facts are in Bulletin PE-30.

4. NEW PYREX brand Y-valve. Now you can get a Y-valve for handling most fluids without corrosion or contamination. The valve comes in 1½" and 2" sizes—with 1" to be available soon. You get a tight seal, because a spring-loaded plug keeps TEFLON firmly against the seal. You can disassemble without removing the valve from the line. And you get extra strength, because the body is tempered, then armored with FIBERGLAS impregnated with a polyester resin. Use this valve to 50 psi, up to 250°F indoors, 175°F outdoors, with temperature differentials as high as 200°F. New Bulletin PE-4 gives details.

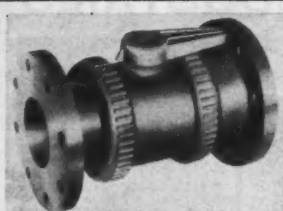


CORNING GLASS WORKS

3 Crystal Street, Corning, N. Y.

CORNING MEANS RESEARCH IN GLASS

Check 2787 opposite last page



Plastic ball valves

... of molded four-inch type have straight-through, non-turbulent low-pressure drop flow characteristics. They are fitted with 150-lb flanges.

Valves have $\frac{1}{4}$ turn shut-off and provision for seat seal take-up. They are available in PVC Types I and II, Kralastic, polypropylene, and Penton.

(Plastic ball valves are product of Chemtrol, 10872 Stanford Ave., Lynwood, California.)

Check 2788 opp. last page.

Phosphating at room temperatures and the savings that can be obtained with this method are discussed in eight-page bulletin. "Cold Phosphating" — Klem Chemicals, Inc., 14401 Lanson Ave., Dearborn, Mich.

Check 2789 opposite last page.

Silica mortar suitable for sulfuric acid up to 1800°F

Uses: For construction of masonry linings in equipment such as storage tanks, concentrators, absorbers, stacks, and chemical process vessels subjected to acids.

Features: Mortar is particularly suitable for sulfuric acid service. It is chemically inert to most inorganic strong acids and will resist concentrated acids at temperatures up to 1800°F.

Description: Silica mortar is based on an aqueous colloidal suspension of silica. It contains over 95% silica. It is non-toxic, non-flammable, and contains no solvents. It is

ANNOUNCING NEW POWELL

Handwheel Nut—securely holds malleable iron, non-heating handwheel to the stem.

Protruding Packing Gland—a Powell feature—compresses the packing, offers additional guidance to the stem, and prevents packing nut from becoming loose and rotating with stem.

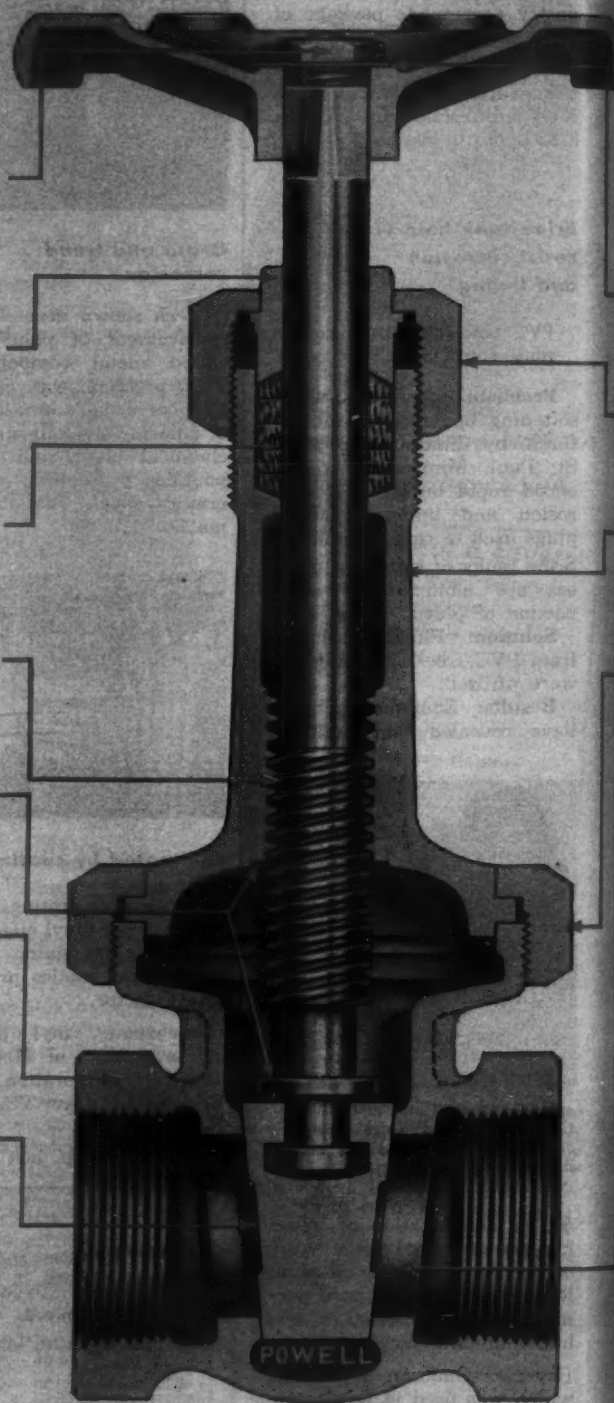
Deep Stuffing Box—holds more than ample amount of high-grade steam packing.

Stem—is high tensile bronze, extra heavy, of large diameter, with long Acme threaded section.

Repack-Under-Pressure Seat and Collar—permit valve to be repacked under pressure when fully open.

Body—a high tensile bronze casting, scientifically designed to provide full flow area through the valve.

Wedges—Interchangeable Solid or Double Wedges are available in rising stem valves. They are held to stem by a "T" slot, and are accurately guided to valve seats by means of integral cast lugs that travel in female guideways in the valve body. Entirely clearing the waterway, full unobstructed flow through is assured.



Sectional—Union Bonnet Rising Stem Gate Valve Fig. 2700—125 pounds, Fig. 2714—150 pounds.

POWELL...world's largest family of valves

BRONZE UNION BONNET GATE VALVES

for 125 and 150 pounds WSP

These new BRONZE Union Bonnet Gate Valves have many superior features—some of which are outlined here. For complete details, write for new illustrated circular. Or check with your nearest Powell Valve distributor.

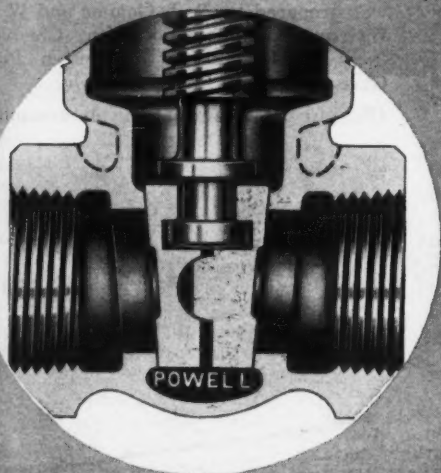
Identification Plate—gives Figure Number and kind of valve.

Heavy Hexagonal Packing Nut—for holding gland and adjusting packing.

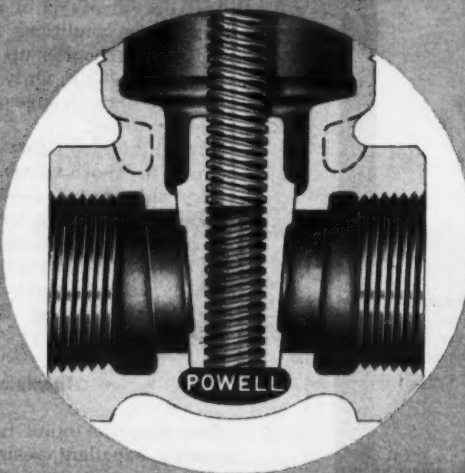
Long Bonnet—cast of high tensile bronze for long service.

Octagonal Ring Nut—is deep threaded and tightly holds body-bonnet connection. Affords additional wrenching positions.

Ample Space—between seats and end of pipe thread prevents injury to seats when screwing pipe into the body.



Detail of Sectional View Inside Screw Rising Stem Gate Valve showing Double Wedge Disc and Integral Seats.



Detail of Sectional View Non-Rising Stem Gate Valve showing Solid Wedge Disc that rises on stem. Integral Seats.



Fig. 2707—125-pound Union Bonnet Non-Rising Stem Gate Valve. Also available for 150 pounds—Fig. 2712.

CORROSION CONTROL

prepared by adding a powder, composed of ground quartz and a hardening agent, to a binder consisting of a low-viscosity liquid. Two are mixed to a workable consistency.

Mortar will set readily in an enclosed area and does not require an acid wash to bring about final cure. Seven to ten days are required for final cure.

(Synar silica mortar is product of Corrosion Engineering Products Dept., Pennsalt Chemicals Corp., Natrona, Pennsylvania.)

Check 2791 opposite last page.

Corrosion-resistant epoxy revealed by blue color

Uses: Applications requiring corrosion-resistant coatings. Particularly in marine atmospheres.

Features: Cured coating has light blue color for identification purposes. It may be alternated with gray or aluminum finish in order to identify individual layers.

Description: Epoxy resin and proprietary curing agent are mixed in proportion of 100:60 by weight. Characterized by absence of solvents, resin may be handled by pressurized spray equipment. Physical properties are as follows:

Pot life, min	60
Specific gravity	1.15
Viscosity	
(@ 75°F), Cps	600
Resin solids	
content, %	90
Flash point, °F	350+

(Epocast 513-A and hardener 9615 are products of Furane Plastics Incorporated, 4516 Brazil St., Los Angeles 39, California.)

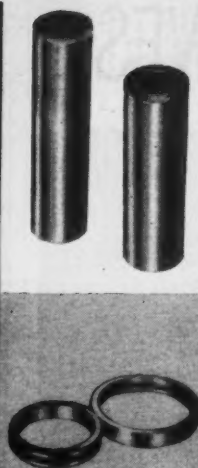
Check 2792 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

THE WM. POWELL COMPANY • Dependable Valves Since 1846 • Cincinnati 22, Ohio

Check 2790 opposite last page

**Resist
Corrosion
Heat
Wear**



Custom Welded Hard-Faced Components

**Reduce Downtime,
Replacement And
Maintenance Costs**

As recognized specialists in the applications of super alloys to critical areas of stainless steel and ferrous metal parts, Cleveland Hard Facing, Inc., is your dependable source for components that offer: . . . high compressive strength up to 256,000 psi and good flat impact and high hot strength. . . . excellent resistance to many corrosive acids, alkalis or oxidizing materials. . . . inherent resistance to wear, erosion, abrasion and cavitation. Send in your blue print for our quotation or recommendations on your application.



Send for complete details on how this unique process can add greater service life to your equipment.



Cleveland Hard Facing, Inc.
3047 STILLSON AVENUE • CLEVELAND 15, OHIO

Check 2793 opposite last page

**CHEMICAL
PROCESSING**

CORROSION CONTROL
... 6th Annual Feature



recent technical papers

Nitric acid up to 65% and 265°F resisted by zirconium

**Titanium withstands caustic
up to 73% strength**

Recent technical paper presents information obtained from corrosion tests conducted on zirconium, titanium, and other metals and alloys in seven Columbia-Southern plants.

Zirconium

Zirconium proved to be highly resistant to all concentrations of nitric acid under all exposure conditions. It was tested at nitric acid strengths up to 65% at temperatures to 265°F. Only tantalum was as good over entire range among a number of metals tested.

Zirconium also showed excellent resistance to hydrochloric acid up to 36% — dry chlorine — sodium hydroxide in all concentrations up to 73% at 280°F — and in calcium chloride solutions up to 55% and 235°F. Zirconium is being successfully used in plant equipment in dry chlorine and strong hydrochloric acid service.

Titanium

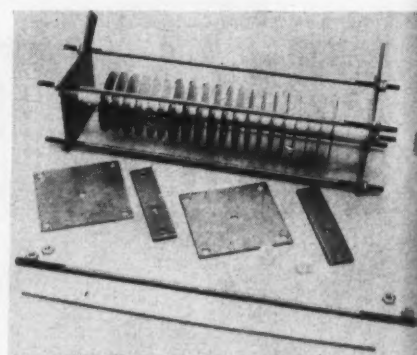
One surprise found from tests was titanium's excellent resistance to sodium hydroxide solutions up to 73%, mostly because previous data stopped at 40-50% concentrations.

Titanium was found to be particularly outstanding in wet chlorine gas under all conditions up to 205°F — solutions containing chlorine — hypochlorous acid and hypochlorites — nitric acid at 35 to 65% concentrations up to 265°F — calcium

chloride up to 55% and 235°F — sea water — and atmospheres containing chlorine and hydrochloric acid.

(Condensed from technical paper, "The Corrosion Resistance of Titanium and Zirconium in Chemical Plant Exposures," which was presented at the 1959 Annual Meeting of the National Association of Corrosion Engineers in Chicago. Paper was prepared by P. J. Gegner and W. L. Wilson, Columbia-Southern Chemical Corporation, Subs. of Pittsburgh Plate Glass Company, Barberton, Ohio.)

(For further information on zirconium



Spool-type specimen holder for use in process vessels. Another type was used for pipe lines. Most of exposures were made with standard International Nickel-type circular coupons, mounted in duplicate on specimen holders. Holders provide for complete isolation of coupons from one another and from holder itself

CHEMICAL PROCESSING

contact Columbia-National Corporation, 70 Memorial Drive, Cambridge 42, Mass.)

Check 2794 opposite last page.

(For further information on titanium contact Union Carbide Metals Co., Div. of Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.)

Check 2795 opposite last page.

Titanium, silver, stainless, nickel, copper alloys available as clad

Vacuum bonding used more for economical protection

An increasingly large variety of metals and alloys are becoming available in clad produced by the vacuum bonding process. Hence, required corrosion resistance can be obtained by the use of a relatively thin layer of a comparatively expensive corrosion-resistant alloy. This is metallurgically bonded to a thicker, lower-cost backing plate such as mild steel or low-alloy steel to provide strength.

Types of Cladding

At present clad plates can be furnished on commercial basis with cladding in titanium, silver, copper and cupronickel alloys, nickel and nickel alloys, and 12 types of stainless steel.

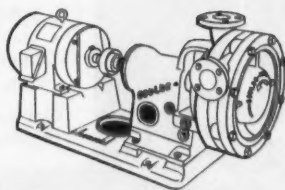
In addition to these materials, vacuum-bonded clad is in the experimental or development stage in other metals. These include zirconium, tantalum, molybdenum, brass, bronze, 200 stainless, 17-7-PH stainless, and Haynes Stellite alloys X, 25, 6B, and Multimet. Backing plates are not limited to mild or low-alloy steels. For example, gold and platinum, clad on stainless, have been produced experimentally.

Vacuum Bonding Process

Hortonclad process integrally bonds metals together by a combination of vacuum, heat, and atmospheric pres-



IS THIS HAPPENING INSIDE YOUR PUMPS?



The Goulds-Pfaunder glassed pump is available in conventional hydraulic design, simplifying installation and maintenance. Four sizes with capacities up to 700 GPM, heads up to 140 ft.

When you pump corrosives, the inside of your pump can look like this. Or . . .

You can pump corrosives *without* corrosion with the Goulds-Pfaunder Fig. 3708 glassed pump. *Every surface that comes in contact with the pumpage* is protected by tough borosilicate glass fused permanently to the metal!

This glass-to-metal bond resists most acids at temperatures up to 350°F and alkalis at moderate temperatures.

You also prevent loss of product due to contamination, since glass is *inert*. Glass is *smooth*—discourages product adhesion and scale build-up.

For all the details, write for Bulletin 725.2 . . . plus a second booklet, "It's What's Inside That Counts," that gives you the inside story behind the new Goulds-Pfaunder glassed pump. Write Goulds Pumps Inc., Dept. CP-79, Seneca Falls, New York.

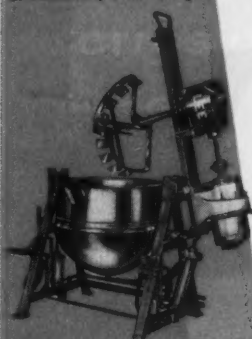
GOULDS  PUMPS

Check 2796 opposite last page

IN CORROSION RESISTANT PROCESSING EQUIPMENT



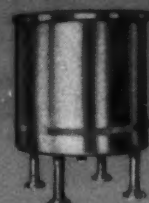
Style A Kettle
1/2 Jacketed, 5 to 500 gal.



Style CW3T Kettle
with Center-Line Scraper
Agitator, 80 to 300 gal.

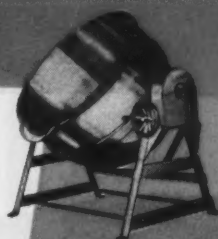


Pressure Kettle
1/2 Jacketed,
40 to 200 gal.



Pulp Tank
300 to 2,000 gal.

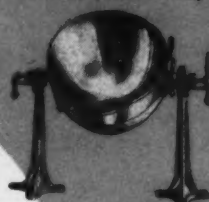
The Name for
Quality is
LEE



Style CW Kettle
1/2 Jacketed,
80 to 300 gal.



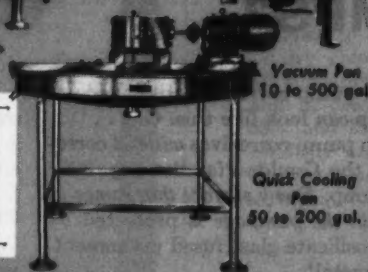
Style B Kettle
Full Jacketed, 10 to 300 gal.



Style C Kettle
1/2 Jacketed,
5 to 100 gal.



Storage Tank
100 to
5,000 gal.

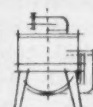


Vacuum Pan
10 to 500 gal.

Quick Cooling
Pan
50 to 200 gal.

SPECIAL DESIGNS

Interested in modifications of standard units or custom-designed equipment? Our facilities are such that we can make any special designed units you may require. Write us.



WRITE for bulletins on any of the products illustrated.

LEE
METAL PRODUCTS
COMPANY, INC.

A.S.M.E.
CODE CONSTRUCTION



Kettles,
Plain and
Jacketed

Tanks,
Processing
and Storage

Agitators
and
Accessories

Vacuum
and Pressure
Equipment

418 PINE STREET, PHILIPSBURG, PA.

CORROSION CONTROL

sure. Union of metals is produced in a high vacuum in a closed envelope. Evacuated envelope or sandwich is heated in a furnace to a temperature above melting point of bonding metal but below melting point of either clad layer or backing plate. Sandwich may be assembled to produce two to ten finished clad plates per heat, greater number being employed for thinner plates.

Stainless or other corrosion-resistant metal plate is placed on inside of sandwich where its finish is preserved.

High-vacuum bonding produces a flux-free union of metals. Vacuum approaching within a few microns of absolute zero pressure is maintained, producing an outer pressure of about one ton/sq ft. Vacuum inside provides freedom from oxidation, removes gases liberated from surface during heating, and promotes wetting of bonded

surfaces by molten alloy. Typical bonding temperature is approximately 2000 degrees Fahrenheit.

Clad metal plate is available in thicknesses from 3/16" minimum for backing and 1/16" minimum for cladding to an upper limit of 6" total thickness or more. Maximum size with present facilities is 10 x 35'.

(Condensed from technical paper, "Hortonclad, A Versatile Tool for Bonding Many Corrosion-Resisting Metals." Paper was presented at the Annual Meeting of the National Association of Corrosion Engineers in Chicago in March 1959. Author is Robert A. Davis, Chicago Bridge & Iron Company, Birmingham, Ala. For further information contact Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.)

Check 2798 opposite last page.

Got a STRAINER PROBLEM

LET MULTI-METAL HELP SOLVE

Multi-Metal designs and fabricates STRAINERS TO YOUR EXACT NEEDS—of any metal—in the size of a thimble to cylinders several feet long—as elements only or complete housings.

- Whether you want to strain slurries of 20 cps. or 1 cp., at 1 gpm or 20 gpm. — — —
- Multi-Metal-designed strainers can remove particles as small as 10 microns and still keep pressure drop to a minimum.
- There is no limit to design. Where time is important, Multi-Metal's quick opening can be furnished.

Get our recommendations on your next strainer problem.



MULTI-METAL WIRE CLOTH CO., Inc

1356 GARRISON AVE., NEW YORK 59, N.Y.

Check 2797 opposite last page

Check 2799 opposite last page

CHEMICAL PROCESSING

CORROSION CONTROL

Controls corrosion by elimination of harmful gases

Catalytic system also prevents air pollution

Rather than providing corrosion-resistant materials of construction to withstand chemical vapors in a plant area, recent technical paper suggests a different approach of eliminating the corrosive vapors through catalytic decomposition. Although primarily designed for air pollution control, the corrosion control factor is of equal importance in many applications.

Catalysts employed in system are platinum family metals. As gases pass through unit, they are oxidized to inert materials in a single step.

System has frequently been employed in nitric acid plants where nitrogen oxides are re-

duced to colorless, clean exhaust. However, it has also been used in other types of plants.

(Condensed from technical paper, "System Designs for the Catalytic Decomposition of Nitrogen Oxides," by J. L. Donahue, Project Engineer, Catalytic Combustion Corp., 4725 Fourteenth, Detroit 8, Michigan.)

Check 2800 opposite last page.

Rust-prevention coating is depicted in four-page Ospho Bul—Rusticide Products Company, 3125 Perkins Ave., Cleveland 14, Ohio.

Check 2801 opposite last page.

Pinch-type valves are described and uses listed in Cat FL-1116R and FL-935—Farris Flexible Valve Corp., 505 Commercial Ave., Palisades Park, N. J.

Check 2802 opposite last page.



... it's VIKING PUMPS exclusively at Tousey Varnish Company's New Plant

When Tousey Varnish Company of Chicago built a new 1,000,000-gallon capacity paint and enamel plant at East Moline, Illinois, they installed twenty-five Viking Pumps. It is one of the most modern plants in the nation, and is entirely Viking Pump equipped, including 10, 18, 35, 50, 90 and 200 GPM sizes. When solvents, resins and varnish arrive at the plant in tank cars and transports, Viking Pumps unload them. Within the plant Viking Pumps transfer liquids and pastes, and are used with filtering equipment. Finally, Viking Pumps load finished products for delivery. D. A. Rhode, Manager of Manufacturing, states that the Viking Pumps are operating perfectly and he appreciates their reliability.

If you have a complete, new plant to equip or just one pumping problem to solve, learn what Viking positive displacement pumps can do for you.

Write today for bulletin series 59SCC.

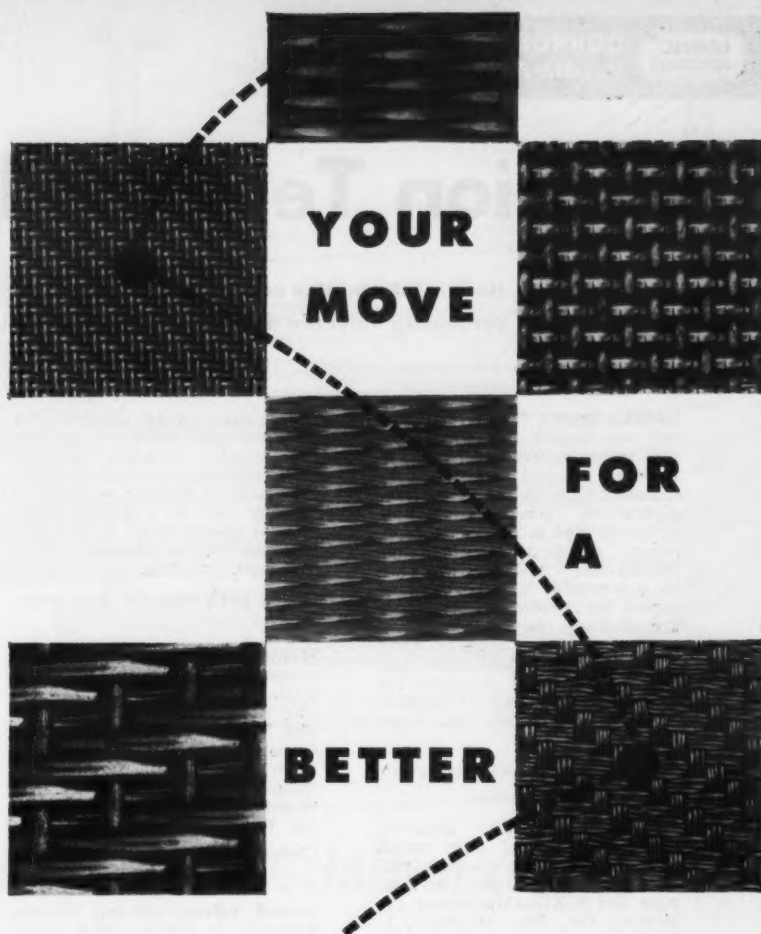


VIKING PUMP COMPANY

Cedar Falls, Iowa, U.S.A. In Canada, it's "ROTO-KING" pumps

See Our Unit in Chemical Engineering Catalog.

Check 2803 opposite last page



ANTI-CORROSIVE WIRE CLOTH

- SPACE CLOTH • MESH CLOTH
- BOLTING CLOTH • FILTER CLOTH
- BACKING CLOTH • STRAINERS • SIEVES
- FABRICATED WIRE CLOTH PARTS



Come to NEWARK for any woven wire cloth or fabricated wire cloth parts requirement, all widths, all meshes, all malleable metals. Send for latest literature.

Newark Wire Cloth COMPANY

351 Verona Avenue • Newark 4, New Jersey

Check 2804 opposite last page



Corrosion Technical Literature

Here is information on new bulletins and brochures
containing valuable data to help you in fighting corrosion

Inhibitor papers, for prevention of rust and tarnish on ferrous and non-ferrous metals, are treated in 116-page manual. Included are sections concerning inhibitor papers in general, inhibiting agents utilized in papers (incorporating specifications, inhibiting volume charts, and table of effects on non-metallic materials), special papers for protection of copper and/or silver, case histories, and samples of various types of paper and bags. "Orchard Inhibitor Papers"—Industrial Products Division, Orchard Paper Company, 3914-24 Union Blvd., St. Louis 15, Mo.

Check 2805 opposite last page.

Metallizing systems, involving bonding of treated pure metals to steel base for corrosion protection, are dealt with in four-page Bul 93XG—Metallizing Engineering Co., Inc., Westbury, L. I., N.Y.

Check 2806 opposite last page.

Corrosion-resistant fan applications are outlined in 14-page Bul AM 1001—Sturtevant Division, Westinghouse Electric Corporation, Hyde Park, Boston 36, Mass.

Check 2807 opposite last page.

Molded cups, for pump pistons, hydraulic service, and pneumatic equipment, are reviewed in Bul AD-145—The Garlock Packing Company, 436 Main St., Palmyra, New York.

Check 2808 opposite last page.

Bonding material, which bonds wide variety of materials to themselves or to each other is delineated in Plastic Steel Bul—Devcon Corporation, 136 Endicott St., Danvers, Mass.

Check 2809 opposite last page.

Stainless steel valves are featured in catalog which also covers valves made of plastics and alloys. Cat 425 — W. G. Rovang & Associates, Inc., 1945 N. Columbia Blvd., Portland 17, Oregon.

Check 2810 opposite last page.

PVC valves, of all molded construction, are delineated in six-page circular, including extensive table outlining resistance of valves to effects of various reagents at 72 and 140° F. Circular 601—The Lunkenheimer Company, Beekman St. at Waverly Ave., Cincinnati 14, Ohio.

Check 2811 opposite last page.

Stainless steel handbook features comparative corrosion resistance tables on stainless types 302, 316, 430, and Aluminum Type 1100. The 36-page book also gives information on physical properties, fabrication, and maintenance. "Stainless Steel Handbook"—Washington Steel Corp., Washington, Pa.

Check 2812 opposite last page.

Coated valves, utilizing Penton, Kanigen, or Teflon, (plug only), are tabulated in eight-page Bul V-614—Rockwell Manufacturing Company, 400 N. Lexington Ave., Pittsburgh 8, Pa.

Check 2813 opposite last page.

Corrosion-resistant coatings for steel, concrete, wood, and linings where corrosive spillage, fumes, and atmospheres are involved is subject of bulletin. Bul 259 — Wisconsin Protective Coating Corp., Green Bay, Wis.

Check 2814 opposite last page.

Teflon-impregnated felt for gaskets and seals is specified in a single-page Teflon-impregnated felt Bul—General Plastics Corporation, 165 Third Ave. at E. 26th St., Paterson, N.J.

Check 2815 opposite last page.

Centrifugal pumps for corrosives are discussed in four-page bulletin. Included is information on recently developed hydrostatically balanced seal for the alumina ceramic pumps. This seal permits pumping of liquid bromine, hydrogen peroxide, sodium hypochlorite, and mixtures of acids and solvents. Bul LV-758—General Ceramics Corporation, Keasbey, N.J.

Check 2816 opposite last page.

Protective linings and coatings for corrosion and contamination control are explained in Lithcote Cat —Lithcote Corporation, 5000 W. Lake St., Melrose Park, Ill.

Check 2817 opposite last page.

Stainless condenser tubing and its successful use in a large eastern plant is subject of ten-page report. Complete technical data is given on the use of the tube for condensers. "Application of Stainless Tubing"—Alloy Tube Div., The Carpenter Steel Co., Union, New Jersey.

Check 2818 opposite last page.

Stainless steel valves are classified in a bulletin, including design detail information. Bul 7—Alloy Steel Products Company, Inc., Linden, N.J.

Check 2819 opposite last page.

Corrosion-resistant coating applications, utilizing variety of types, are outlined in series of single-page reports from industry. Coating Reports from Industry—Gates Engineering Company, 100 S. West St., Wilmington 99, Del.

Check 2820 opposite last page.

Metallized coatings are discussed and results of application tests presented in eight-page Metallized Coating Brochure — Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

Check 2821 opposite last page.

Bi-metal tubes and how they can solve corrosion problems involving condensers and heat exchangers is discussed in 24-page brochure. Case history information is included. "Solving Corrosion Problems in Industry"—Bridgeport Brass Company, Bridgeport 2, Conn.

Check 2822 opposite last page.

Teflon lined hose for variety of corrosion-resistance applications, is shown in 12-page Cat M680—Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, New Jersey.

Check 2823 opposite last page.

Titanium cost cutting ideas are considered in 14-page booklet, which incorporates section on titanium pumps, titanium valves, and technical data on corrosion resistance of commercially pure titanium in specific media. Discussion of these points is included in "Cost Cutting Ideas in Titanium"—Mallory-Sharon Metals Corporation, Niles, Ohio.

Check 2824 opposite last page.

Centrifugal pumps designed for handling a wide variety of corrosive products are described in eight-page catalog. "Centrifugal pumps"—Carl Buck and Associates, P. O. Box 267, Essex Fells, New Jersey.

Check 2825 opposite last page.

Fusion technique, for joining polyethylene pipe and other components, is summarized in four-page Polyfusion Bul—American Vulcathene, Division of Nalge Co., Inc., 75 Panorama Creek Dr., Rochester 2, N. Y.

Check 2826 opposite last page.

Polyester resin for use in making reinforced plastic products with outstanding resistance to corrosion is discussed in four-page bulletin. "Uraloy 7416"—Finishes Div., Interchemical Corporation, P. O. Box 659, Newark 1, N. J.

Check 2827 opposite last page.

Corrosion-resistant coatings, based on vinyl reinforced synthetic varnishes, are subject of a four-page bulletin. Application ideas, selection data, specifications, and methods are fully outlined in Vyn-Al Bul—The Glidden Company, 900 Union Commerce Bldg., Cleveland 14, Ohio.

Check 2828 opposite last page.

Urethane coatings which are reported to give increased life and coverage in a number of severely corrosive applications are discussed in four-page bulletin. Case history information is included. "Urethane Coatings"—Poly-Form Manufacturing Co., P. O. Box 305, Escondido, Calif.

Check 2829 opposite last page.

Maintenance coating systems are incorporated in four-page Chart 5—Carboline Company, 32 Hanley Industrial Court, Brentwood 17, Mo.

Check 2830 opposite last page.

Wire cloth which resists corrosion is cataloged in Wire Cloth Cat—Newark Wire Cloth Company, 351 Verona Ave., Newark 4, N. J.

Check 2831 opposite last page.

Silicone-base finishes, for high temperature industrial coating applications, are topic of four-page Sicon Bul—Midland Industrial Finishes Co., East Water St., Waukegan, Ill.

Check 2832 opposite last page.

Mortar for coating concrete, cement, and other surfaces in highly corrosive atmospheres is subject of two data sheets. Data sheets CP-630, CP-361 — Corrosion Engineering Products Department, Pennsalt Chemicals Corp., Natrona, Pennsylvania.

Check 2833 opposite last page.

Electrical housings for use under many different conditions causing corrosion are discussed in 16-page bulletin. Bul 2699 — Crouse-Hinds Company, Syracuse 1, N.Y.

Check 2834 opposite last page.

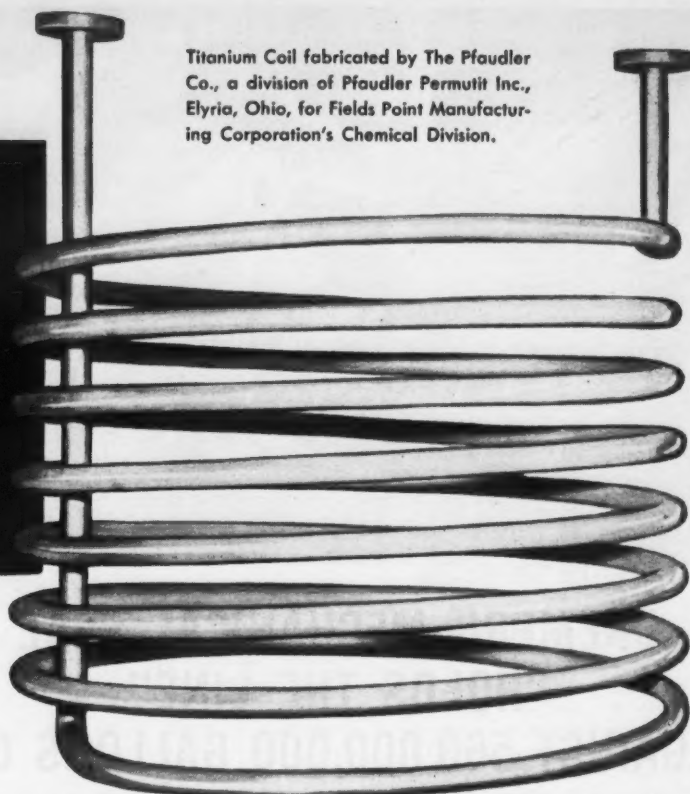
Exhaust systems made from thermoplastics for combating corrosion are discussed in literature. Units can be made from polyethylene, polypropylene or polyvinyl chloride. "Exhaust Systems" — American Agile Corp., P.O. Box 168, Bedford, Ohio.

Check 2835 opposite last page.



"For your outstanding work in the corrosion control field, we give you this special award . . ."

TITANIUM COIL proves durable in sodium hypochlorite



Titanium Coil fabricated by The Pfadler Co., a division of Pfadler Permutit Inc., Elyria, Ohio, for Fields Point Manufacturing Corporation's Chemical Division.

expected to outlast silver...initial cost is less

The corrosive action of chlorine gas bubbling through a sodium hypochlorite solution meant replacement of cooling coils regularly. Even silver pipe lasted only about 2,500 batches.

Experiments with titanium were encouraging and after 6 months' exposure under operating conditions there was no detectable deterioration.

The first coil fabricated from Damascus titanium 2" O.D. x 16 ga. tubing was installed and is now in service. Fields Point Manufacturing Company anticipates a service life of at least 5,000 to 10,000

batches. And the purchase of additional titanium coils is being considered.

Titanium being stronger than silver, a lighter gauge tube could be employed. Since fewer pounds of material were required, this meant the initial cost of the titanium coil was less than one made from silver.

For general corrosive service, Damascus offers stainless steel pipe and tubing in a full range of A.I.S.I. standard analyses but, where unusual corrosive service is encountered, can furnish exotic metals and special alloy grades.

COMPLETE INFORMATION ON RARE AND REACTIVE METALS PIPE AND TUBING

New 44-page handbook contains data on applications, heat treatment, corrosion resistance, chemical and physical analysis, mechanical properties of Zirconium, Zircaloy 2, Zircaloy 3; Titanium, grades 40, 55, and 70; Precipitation Hardening Steels, A-286, 17-7-PH, 15-7-MO; HASTELLOY ALLOYS, A, B, C, F, and X.



DAMASCUS TUBE COMPANY
Greenville, Pa.

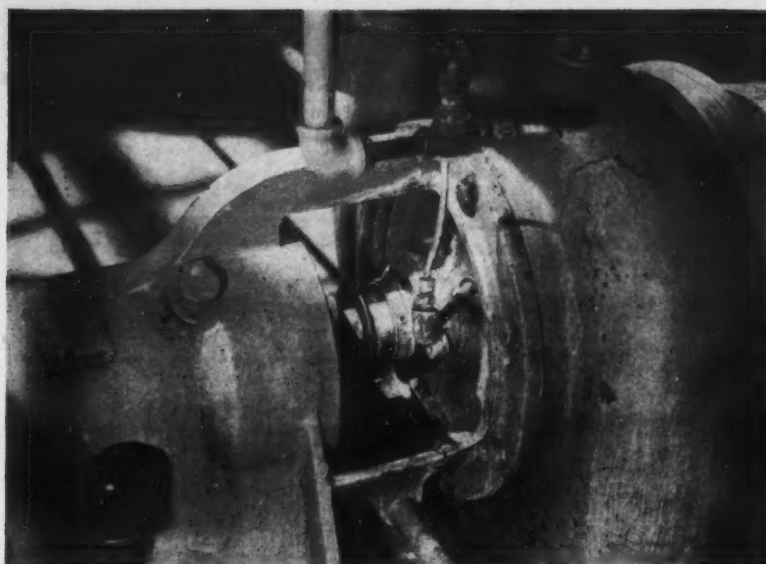
Gentlemen: Please send me your new 44-page handbook.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____



DAMASCUS TUBE COMPANY
STAINLESS STEEL TUBING AND PIPE
GREENVILLE, PENNSYLVANIA

Check 2836 opposite last page



CHEMPRO MECHANICAL SEAL "HOLDS THE LINE" AGAINST 560,000,000 GALLONS OF ORANGE JUICE CONCENTRATE



In September, 1956, CHEMPRO MECHANICAL SEALS* were installed in 4 Allis-Chalmers high speed pumps located at the Minute Maid processing plant in Leesburg, Florida. The pumps recirculate orange juice through evaporators used to produce frozen orange concentrate.

So far, each pump and SEAL has handled approximately 560,000,000** gallons of concentrate. This service is so tough that most other previously used packings and seals needed frequent replacement. The original CHEMPRO MECHANICAL SEALS are still in operation and there has been no leakage whatsoever in any of the pumps.

*CHEMPRO MECHANICAL SEAL, Size 250 W/C, quenched, 316 stainless steel with Carbon vs. Ceramic Seal Faces.

** Pump handles 2,000 gal. of concentrate per minute and runs 24 hours per day, 7 days per week, for 7 to 8 months each year.



CHEMICAL & POWER PRODUCTS, INC.
The Original Fabricators of Teflon Packings and Gaskets

9 Broadway, New York 4, N. Y.

Check 2837 opposite last page

CORROSION CONTROL

Switch to stainless stops corrosion

Problem: A southwestern plant, which produces acetic acid, acetaldehyde, and related products, was originally constructed utilizing metals selected for corrosion resistance to specific chemicals. Nevertheless, serious corrosion developed.

Solution: Replacement of corroded metals with Type 316 stainless steel was initiated.

Results: Type 316 stainless steel has provided satisfactory



Type 316 stainless steel was utilized in construction of acetate reactor column

service. It has also prevented formation of metal salts which accelerated corrosion and caused product contamination.

(Type 316 stainless steel, as used in this application, is product of Armco Steel Corporation, Middletown, Ohio.)

Check 2838 opposite last page.

Corrosion defects, pitting revealed to sight by black light

Aerosol-type cans contain necessary liquids

Uses: Location of cracks, pores, leaks, and other defects open to surface in any solid material. Particularly for detection of pitting and corrosion.

Features: Unit is complete-

ly portable. Necessary liquids are contained in pushbutton pressurized spray cans.

Description: In testing with fluorescent inspection kit, penetrating agent is sprayed



Portable black light locates corrosion defects as glowing fluorescent indication

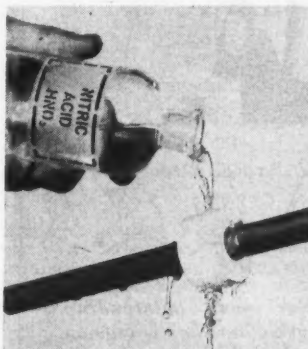
on surfaces of part. After time lapse to allow penetration, cleaner is used to remove penetrating agent from surface. Finally, developer is sprayed on to draw penetrating agent to surface from any crack or pore. Portable 115v black light locates defects as fluorescent indication.

(Zyglo ZA-43 portable kit is product of Magnaflux Corporation, 7300 W. Lawrence Ave., Chicago 31, Ill.)

Check 2839 opposite last page.

Non-lubricated bearings operate to 1800°F

Preliminary results of chemical durability tests, conducted on journal bearings of Pyroceram glass-ceramic, indicate that such bearings will hold up under conditions of temperature and corrosion



Corrosive liquids have no detrimental effect on journal bearings of glass-ceramics

→ → THIS 2-COAT PROTECTIVE SYSTEM SAVES 1/3 IN COATING COSTS

Planning a new chemical plant—addition—or revamping? Then specify Rowe's EPOLOID HI MIL epoxy coating system. You will save 1/3 the usual costs—or more!

Here's Why...

- | | |
|---|--|
| <p>1 SAVE the cost of a 3rd coat — 2 coats will suffice for long-lasting protection.</p> <p>2 SAVE early recoating costs. EPOLOID HI MIL COATING will last 5-6 years in heavily corrosive environments with only 1 prime and 1 finish coat.</p> | <p>3 SAVE capital expenditures on new construction or additions with this unusual coating.</p> <p>4 SAVE application costs. EPOLOID is easily applied with brush or spray gun—yields a 2 to 8 mils dry film thickness in one coat.</p> |
|---|--|

Let us give you case history facts that prove you can save 1/3 or more in protective coating costs. Write, wire or phone collect...

ROWE
PRODUCTS INC.

College Avenue and Hyde Park Boulevard
Niagara Falls, New York

Specialists in protective coatings to the chemical process and allied industries since 1921

Check 2840 opposite last page

PUMP volatile sludges & slurries

WITH NO CLOGGING... large clearances through impeller and casing completely prevent dogging.

UNDER LOW NPSH... liberated gases and vapors are vented to suction tank or atmosphere.

WITHOUT GAS OR VAPOR BINDING... vertical top suction prevents binding.

Available in all metals and alloys. Write for Bulletin 206-4.

Lawrence Vertical
Top Suction Non-
Clogging Sludge
Pump



LAWRENCE PUMPS INC.

371 Market Street, Lawrence, Mass.



Check 2841 opposite last page

CORROSION CONTROL

in which would preclude use of conventional bearing metals and lubricants.

Bearings will operate either without lubrication, or with corrosive fluids as lubricants, with different metal shafts to 1800°F.

(Pyroceram composition 9608, from which journal bearings were made, is product of Corning Glass Works, Corning, New York.)

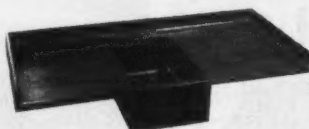
Check 2842 opposite last page.

Chemical-resistant sinks are cast in one piece with rounded corners

Wide temperature variations are withstood

Uses: Applications requiring chemically resistant sinks.

Features: Sinks are cast in one piece. They are immune to a variety of corrosives and



Bench top and sink unit is cast of modified epoxies for chemical resistance

to wide temperature variations.

Description: Black sinks are cast of modified epoxies. Design includes coved corners and bottoms dished to outlet.

Sinks have good mechanical shock resistance. Testing indicates that material from 300°F ovens to dry-ice acetone baths causes no damage to sinks. They are available in 21 sizes, and several grades.

(Durcon sinks are product of The Durcon Company, Inc., Box 1019, Dayton 1, Ohio.)

Check 2843 opposite last page.

NEXT MONTH

Microbiological corrosion problem in water system and how it was solved will be subject of opening feature article in Corrosion Control section.



Plastic Steel®
saved over
\$1000... plus
days of downtime
for MARRINER

A broken centrifuge at Marriner Combing Company stopped production on an important order. PLASTIC STEEL was used for on-the-spot repairs and the machine was back in operation within an hour at a cost of less than \$5.00. Using conventional repair methods would involve several days and cost over \$1000.

Hundreds of companies have saved time and money by repairing worn machine parts, cracked castings, leaking hydraulic systems and tanks, rebuilding worn pumps or valves, etc., with PLASTIC STEEL®.

PLASTIC STEEL® and other Devcon products are used for making jigs, fixtures, metal-forming dies, plastic and rubber molds, foundry patterns and core boxes, and other industrial tools.

PLASTIC STEEL® — as easy to use as modeling clay — hardens to steel-like strength in 2 hours... can be machined with regular tools. Bonds all metals, wood, glass, concrete, etc. to itself or each other. Extremely high tensile, compression, impact strength — excellent chemical resistance.

Find out how PLASTIC STEEL® and other Devcon products can save time, cut maintenance costs and speed production in your plant — write for FREE bulletin today.

Distributed nationally by leading industrial suppliers

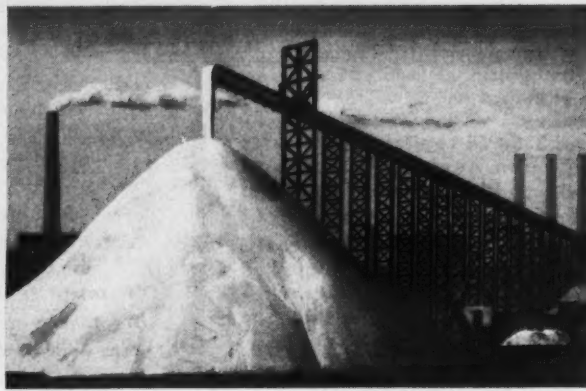
DEVCON CORPORATION
130 ENDICOTT STREET, DANVERS, MASS.

Check 2844 opposite last page

HOW WOULD YOU SOLVE THESE CORROSION PROBLEMS?



1. PROBLEM: Coat inside of factory water tank without affecting taste of the water.



2. PROBLEM: Protect conveyor trestle from the corrosive effects of harmful chemical by-products.



3. PROBLEM: Guard vital parts of a dockside gantry crane from salt spray corrosion.



4. PROBLEM: Coat, while in the field, joints of welded pipe without priming or torching the surface.

JOB-MATCHED COLD COATINGS

PRE-PLANNED...PRE-MIXED...PRE-TESTED

Each Allied Chemical *Job-Matched Cold Coating* (formerly named Barrett) is made to solve specific corrosion problems. When you apply the right control you eliminate costly testing and reapplications. And *Job-Matched Cold Coatings* are inexpensive to begin with!

1. SOLUTION: *Allied Chemical T.O.F.* (#114) Coal-tar material specially compounded for the inside of potable water tanks, pipes, hydrants, hose houses and equipment where no residual taste or odor can be tolerated. Meets AWWA Specification D102-55T, Sec. 5.4.6.

2. SOLUTION: *Allied Chemical CA 50 Coating* (#150) A plasticized, gel-type, coal-tar material that meets U.S. Bureau of Reclamation Specification No. C.A. 50. Protects dams, bridge piers, exposed metal works and concrete subject to extreme corrosion.

3. SOLUTION: *Allied Chemical 34Yc Coating* (#134) A plasticized thixo-tropic, coal-tar material meeting the U.S. Navy, Bureau of Yards and Docks Specification No. 34Yc. Combats corrosion due to salt spray and other reactive conditions—piers, ships, service vessels and offshore installations.

4. SOLUTION: *Allied Chemical Service Cement* (#160) A mastic type coating with high-grade, coal-tar pitch base, plastic material. You don't have to prime for torch field welding. Use it with our Pipeline Fabric. Meets Specification SSC-153, Type II.

You name the area and there's a *Job-Matched Cold Coating* ready to be brushed or sprayed on without heating or activators. Properties include chemical resistance, heavy coating thickness per coat and fast drying.

PLASTICS AND COAL CHEMICALS DIVISION
40 Rector Street, New York 6, N. Y.



Check 2845 opposite last page

CORROSION CONTROL

Hard-surfacing alloy lengthens pump plunger life

Problem: Pump plunger in refinery service handling dilute hydrofluoric acid had to be replaced every two to three months.

Solution: Plunger was protected with 0.045"-thick fusion-bonded overlay of No. 6 hard-surfacing alloy, applied by the Sprayweld process.

No. 6 hard-surfacing alloy is a stainless type having a nickel base. It contains usual chromium carbides found in



Hard-surfaced pump plunger after one year in HF service

conventional nickel-base hard-surfacing alloys, but also contains chromium borides as well. Latter constituents give alloy ability to withstand abrasion and galling in addition to its corrosion resistance.

Results: Hard-surfaced plunger shows only nominal wear after more than one year in service.

(No. 6 hard-surfacing alloy is product of Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich.)

Check 2846 opposite last page.

Pipe fitting joints are accessible

Aluminum pipe fittings have extended straight length to permit joint accessibility. Flanged demountable joints are made by rolling-in operation. This results in leak-proof connection between fitting and serrated flange. Line is offered in schedules 10 and 40. It is stocked in aluminum alloys 3003F, 6061-T6, and 6063-T6.

(Aluminum pipe fittings are product of Speedline Division, Horace T. Potts Company, 504 Erie Ave., Philadelphia 34, Pennsylvania.)

Check 2847 opposite last page.

PROCESS PIPING POINTERS

Why the diaphragm lasts longer in Y-body packless valves

In this Y-pattern body diaphragm valve, disc and diaphragm are separate parts, have separate functions. The disc does the seating while the diaphragm serves only to seal the bonnet against entry of line fluid.



Hence, the diaphragm is not subjected to severe flexing, abrasion and crushing against weir as in valves where it does both bonnet sealing and seating. Made in a wide range of body, diaphragm and lining materials—in sizes ½ to 14 in.—these valves are ideal for many chemical processing fluids. Ask for Circular AD-1942R—see below.

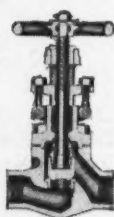
Titanium valves now handling tough acids



Newest special designs for severely corrosive-erosive fluid handling now include cast titanium valves. This 5-in. globe with cylinder operator, developed for service on an acid slurry, has disc and seat of ceramic material. The Y-pattern body gives desired flow characteristics with minimum pressure drop through valve, and maximum seat tightness. This valve also made in conventional handwheel-operated design. For more information, see below. Please mention titanium valves.

Chlorine valves up to 6 in. now regularly available

These specially designed chlorine valves heretofore made in ½- to 2-in. sizes are now stocked in added sizes of 2½, 3, 4 and 6 in. with flanged ends. Features for safe and economical handling of anhydrous gas or liquid chlorine are identical with smaller valves: extra strong steel body with Monel gasketed bonnet joint, Teflon packing. For complete information, see the Crane ad on next page.



For literature or data on products listed above, please contact
J. E. Bradbury, Manager,
Chemical Sales Dept. No obligation.

CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5
VALVES • FITTINGS • PIPE
PLUMBING • HEATING • AIR CONDITIONING
Branches and Wholesalers Everywhere

Check 2848 opposite last page



processing and engineering data

262

CORROSION KEYS

Polyvinyl Chloride Pipe

R. J. BRICMONT, Manager
Engineering Service Dept.
A. M. Byers Company

"Corrosion Keys" are copyrighted (1959) by Putman Publishing Company

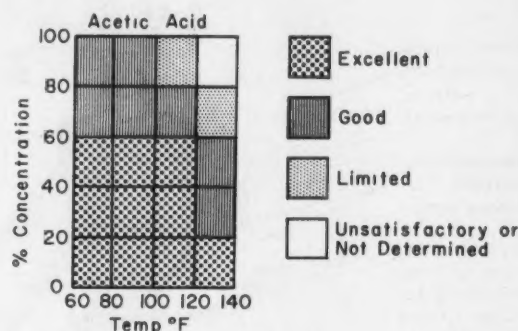
Attached are Corrosion Keys showing resistance of high-quality Type I PVC pipe to various liquids and gases.

As you will note, fluids have been rated at various concentrations and at temperatures ranging from 60 to 140°F. In many cases PVC could be used at temperatures in excess of 140°F. However, higher temperatures should only be recommended after a thorough analysis of all operating conditions. For purposes of general recommendations, 140°F is considered the maximum operating temperature.

In case of plastic pipe, and more specifically PVC, corrosion does not take place through a loss of weight or pitting as with metals. Since plastics are non-conductors, galvanic or electrochemical attack cannot occur.

Corrosion of PVC is an absorption type of reaction wherein corrosive media actually penetrates or diffuses into plastic. For this reason corrosion is normally characterized by a weight gain rather than weight loss. In general, corrosion of plastic materials can best be evaluated by visual inspection — changes in appearance such as swelling and discoloration — and by changes in physical properties such as tensile strength, impact strength, elongation, and flexural strength.

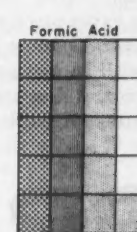
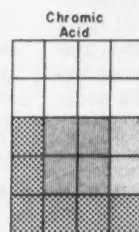
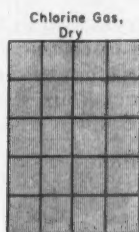
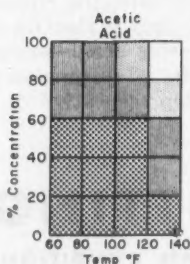
Certain literature references have indicated that corrosion resistance of PVC can be ex-



pressed on a "go or no go" basis; i.e., where it is resistant it suffers no attack, but where it is attacked it is attacked severely. This is completely incorrect. Corrosion resistance of PVC to various environments shows the same characteristics as do other materials. Depending upon the fluid involved, its resistance can range from complete immunity to complete destruction. For this reason it is often necessary to define PVC's corrosion resistance in terms of various classifications.

On these Corrosion Keys "excellent" indicates no attack. "Good" shows PVC pipe would be slightly affected by corrosive but could still be expected to provide satisfactory service. Third rating indicates "limited" service life and fourth "unsatisfactory or no data available."

More keys on page 103



Long engagement with yoke sleeve keeps stem in perfect alignment.

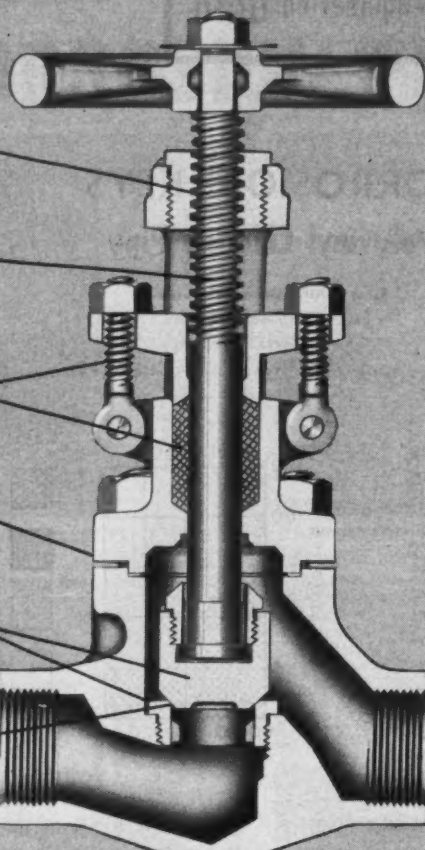
Husky Monel stem—permits high seating force without deflection. Acme threaded.

Teflon packing in extra-deep stuffing box. ... Swinging gland eye bolts for easy servicing.

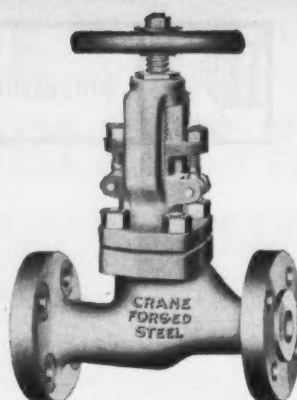
Monel gasketed male-female bonnet joint with heavy bolting. Leakproof; blowproof.

Highly corrosion-resistant Hastelloy "C" disc and body seat.

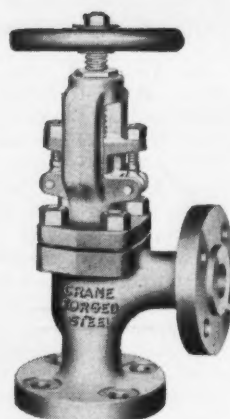
Narrow-bearing, tapered seating faces break down hard deposits ... give tight closure.



Screwed end valves—globe and angle patterns—in sizes ½ to 2 in. incl.



Flanged end globe valve—in sizes ½ to 6 in. incl.



Flanged end angle valve—in sizes ½ to 2 in. incl.

NEW! Crane chlorine valves now in sizes up to 6 in.

Performance-proved over many years in sizes up to 2 in., these *engineered-for-chlorine* valves are now available in larger sizes with flanged ends—2½, 3, 4 and 6 in.

Many features put these valves head and shoulders above any other for gas or liquid chlorine handling. There's extra strength where needed in the steel body and integral bonnet and yoke. The bonnet joint is gasketed with Monel and heavily bolted; it's leakproof and blowproof. A deep stuffing box with Teflon V-ring packing insures long-life stem seal.

Disc and body seat ring are Hastelloy "C" for tight seating with high corrosion resistance. Narrow-bearing, 45-degree taper seating design and the husky Monel stem easily break down any hard deposits on seat faces.

Choose these valves for all water-free chlorine gas or liquid services up to 300 F. They're ideal for chlorinating lines in chemical processing and bleaching, treatment of water and sewage, etc. Get complete specifications from your Crane Representative or write to address below.

CORROSION CONTROL

Stainless pipe unions for high pressure or vacuum

Uses: For use where extreme pressures, vacuum, or corrosive conditions prevail.

Features: Unions have a wholly confined Teflon seal. They are rated for 2000 to 6000 psi.

Description: Unions are made with threaded or sock-



Teflon and stainless combine to produce corrosion-resistant union

et-weld ends from 304 or 316 stainless steel. They are made for nominal pipe sizes of ¼ through 2".

(Koncentrik pipe unions are product of The Special Screw Products Co., Bedford, Ohio.)

Check 2850 opposite last page.

Polyethylene pipe can withstand 40-60 psi

Polyethylene pipe is announced with improved properties which permits it to withstand a working pressure of 40 psi in a well at 195' pumping water level and 60 psi at 150'.

Reason pipe has high strength is that it is made from polyethylene with a molecular structure consisting of chains averaging about 70,000 carbon atoms in length. Pipe is available in 100 and 300' coils. Insert fittings, made of nylon in 1, 1½ and 1½" diameters, are manufactured for use with the pipe.

(High molecular weight polyethylene is product of Semet-Solvay Petrochemical Div., Allied Chemical Corp., 61 Broadway, New York 6, N.Y.)

Check 2851 opposite last page.

(High-strength polyethylene pipe is product of Yardley Plastics Co., Columbus, Ohio.)

Check 2852 opposite last page.

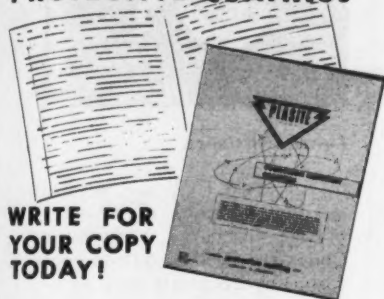
CRANE VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Illinois—Branches and Wholesalers Serving All Areas

Check 2849 opposite last page

Simplify YOUR SELECTION OF PROTECTIVE COATINGS



WRITE FOR
YOUR COPY
TODAY!

PROVEN IN THE PROCESS INDUSTRIES

- STEEL TANK LINING
- CONCRETE TANK LINING
- PROTECTION OF STRUCTURAL STEEL, FUME DUCTS AND EQUIPMENT
- CONCRETE FLOORS
- TANK CARS

FOR IMMERSION SERVICE FOR HEAVY DUTY MAINTENANCE SERVICE

COLD SET COATINGS

HEAVY BUILD using standard spray or brush methods.
WIDE CHEMICAL RESISTANCE to acids, caustic solvents, salts, de-ionized water, and aqueous solutions.

HIGH TEMPERATURE RESISTANCE not affected by thermal shock.

AIR DRY field applications.

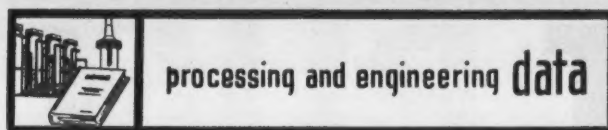
EXCELLENT BOND — No Primers on white metal blasted surface.

OTHER PLASITE PRODUCTS

INCLUDE: CAULKING COMPOUNDS
PRIMERS
BAKING COATINGS

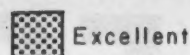
WISCONSIN
protective
coating
COMPANY GREEN BAY, WIS.
REPRESENTED IN PRINCIPAL INDUSTRIAL AREAS

PLASITE



processing and engineering data

CORROSION KEYS: PVC Pipe — From page 101



Excellent



Good

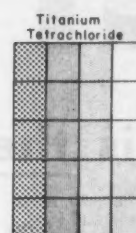
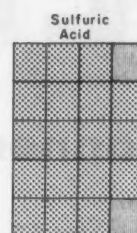
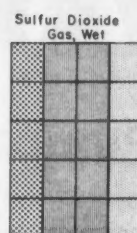
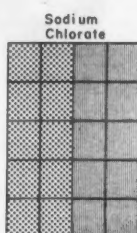
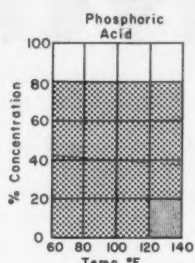
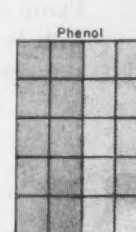
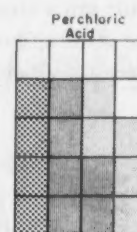
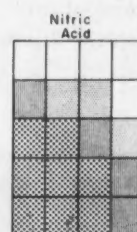
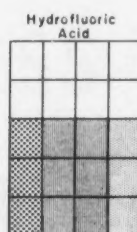
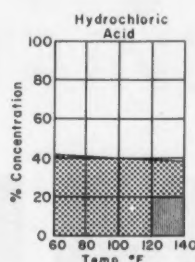


Limited



Unsatisfactory or
Not Determined

262



PVC pipe has an excellent rating for handling all concentrations of following chemicals at temperatures to 140°F.

acetylene
alum
aluminum chloride
aluminum hydroxide
ammonia — dry gas
calcium bisulfite
calcium carbonate
calcium chloride
calcium hydroxide
calcium hypochlorite
carbonic acid
carbon dioxide gas
carbon dioxide — aqueous solution
caustic potash
caustic soda
chlorine — aqueous sol.
citric acid
copper chloride
copper nitrate
copper sulfate
crude oil — sour or sweet
ethyl alcohol
ethylene glycol
fatty acids
ferric chloride
ferric nitrate
ferric sulfate
ferrous chloride
ferrous sulfate

fluorosilicic acid
fruit pulps and juices
gas — natural
gasoline — sour
glycerine (glycerol)
hydrofluorosilicic acid
hydrogen peroxide
hydrocyanic acid
or hydrogen cyanide
hydrogen sulfide
hypochlorous acid
magnesium chloride
magnesium hydroxide
magnesium nitrate
magnesium sulfate
nickel chloride
photographic chemicals
potassium cyanide
potassium hydroxide
salt water
silver plating solutions
sodium bicarbonate
sodium carbonate (soda ash)
sodium chloride
sodium hypochlorite
sodium nitrite
sodium thiosulfate (hypo)
stannic chloride
sugar liquor (beet & cane)
sulfur

tannic acid
tanning liquors
trisodium phosphate
vinegar
water — potable

water — distilled or deionized
zinc chloride
zinc sulfate
paper liquor (white, green & black)

Following media cannot be satisfactorily handled by PVC pipe:

acetone
aniline
benzene
ethers

ethyl chloride
toluol or toluene
xylene or xylol

These Corrosion Keys are based on the results of service performance and/or laboratory tests. They represent the most reliable data available to us. They are intended for rapid preliminary selection of materials and should only be used for guidance purposes. Manufacturer should be consulted for further information in regard to a given application.

It should be brought out that these ratings are applicable only to highest quality Type I PVC pipe. They do not necessarily apply to all commercially available PVC pipe.

(Further information on PVC pipe can be obtained from A. M. Byers Company, Clark Bldg., PO Box 1076, Pittsburgh 30, Pa.)

Check 2854 opposite last page.

the **BEST PUMP**

for volatile fluids is the Canned Pump

Pump and motor are a single, leakproof unit . . .
with no seals or stuffing boxes. Volatile fluids
stay inside where they belong.

CHEMPUMP

is the Canned Pump

. . . the answer to your difficult pumping problem.
Only Chempump—the original canned pump—offers you
these advantages:

- **experience-proved design . . .**
stemming from 7 years of rugged field
service. *Only Chempump has it!*
- **nation wide field engineering . . .**
personnel with specialized application
knowledge you must have. *Only Chempump has it!*
- **field-proven performance record . . .**
in thousands of installations in all types of
service. *Only Chempump has it!*

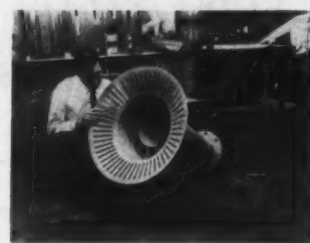
Use *the* canned pump—Chempump—to handle your
volatile or toxic or costly, or any other "problem" fluid.
Write today . . . for "request for quote" data sheet . . .
to Chempump Corporation, Buck and
County Line Roads, Huntingdon Valley, Pa.



First in the field...process proved

Check 2855 opposite last page

CORROSION CONTROL



Fume diffusers

. . . of rigid PVC are for use
as duct sections of primary
blower discharge assemblies.
Cones are used to diffuse cor-
rosive hydrochloric and chro-
mic acid fumes.

(Geon is product of B. F.
Goodrich Chemical Company,
3135 Euclid Ave., Cleveland
15, Ohio.)

Check 2856 opposite last page.

(Rigid Geon sheet is manu-
factured by Seiberling Rubber
Co., Newcomerstown, Ohio.)

Check 2857 opposite last page.

(Fume diffusers are fabri-
cated by Electro-Chemical
Products Company, Cleve-
land, Ohio.)

Check 2858 opposite last page.

Pitting-type corrosion repelled by alloys

Molybdenum-containing al-
loys of 18-8 type have been
recently developed. Alloys
have resistance to corrosion
of pitting type and to detri-
mental effects of velocity and
suspended abrasions. They are
suitable for service in high-
temperature area of 1000 to
1400° F.

(PH55 Series stainless alloys
are product of Cooper Alloy
Corporation, Hillside, N.J.)

Check 2859 opposite last page.

Lining resists HCl, other chemicals

Lining has been especially
developed for tank truck and
railroad tank car use where
the alternate hauling of dif-
ferent chemicals is necessi-
tated. This white semi-hard
elastomer base lining is backed

CORROSION CONTROL

with soft flexible rubber. It is applied in such a manner as to protect the flexible semi-hard face from cracking due to shock and rapid temperature changes.

Lining has been in service alternately transporting successfully solutions of ferric chloride, food-grade phosphoric acid, liquid alum, and 50% sodium hydroxide. It was initially designed for railroad tank cars where it was desired to use the same car for alternately hauling hydrochloric acid. It shows promise of replacing linings now in separate use for such services.

(Arco No. 874 lining is product of Automotive Rubber Co., Inc., 12550 Beech Road at PMRR, Detroit 39, Mich.)

Check 2860 opposite last page.

Heat exchanger corrosion controlled by zinc arrestors

In any heat exchanger circuit, electrolytic corrosion is a problem because construction of the heat exchanger itself involves the use of dissimilar metals. This is particularly true where seawater or other brine-type fluid is handled.

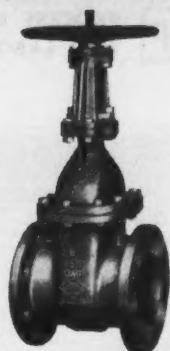
This heat exchanger manufacturer makes no attempt to prevent corrosion, but controls it by providing an accessory component of a material with which the corroding elements will more readily react. Zinc rods are used in small heat exchangers, zinc plates in the larger sizes. Corrosive action is diverted and takes place on the zinc arrestor, which is an inexpensive, replaceable accessory component. Important functional components of the exchanger are thus protected.

(Ross heat exchangers with zinc arrestors are product of American-Standard Industrial Division, Detroit 32, Mich.)

Check 2861 opposite last page.

Monel small tube, of conventional, R, 403, and K types, is classified in four-page Monel Tube Tech Bul—Superior Tube Company, Norristown, Pa.

Check 2862 opposite last page.



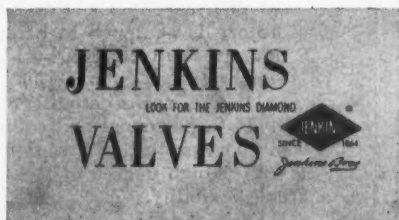
In this Split Wedge Gate
you can see why it pays to

Specify JENKINS for STAINLESS STEEL Valves, too

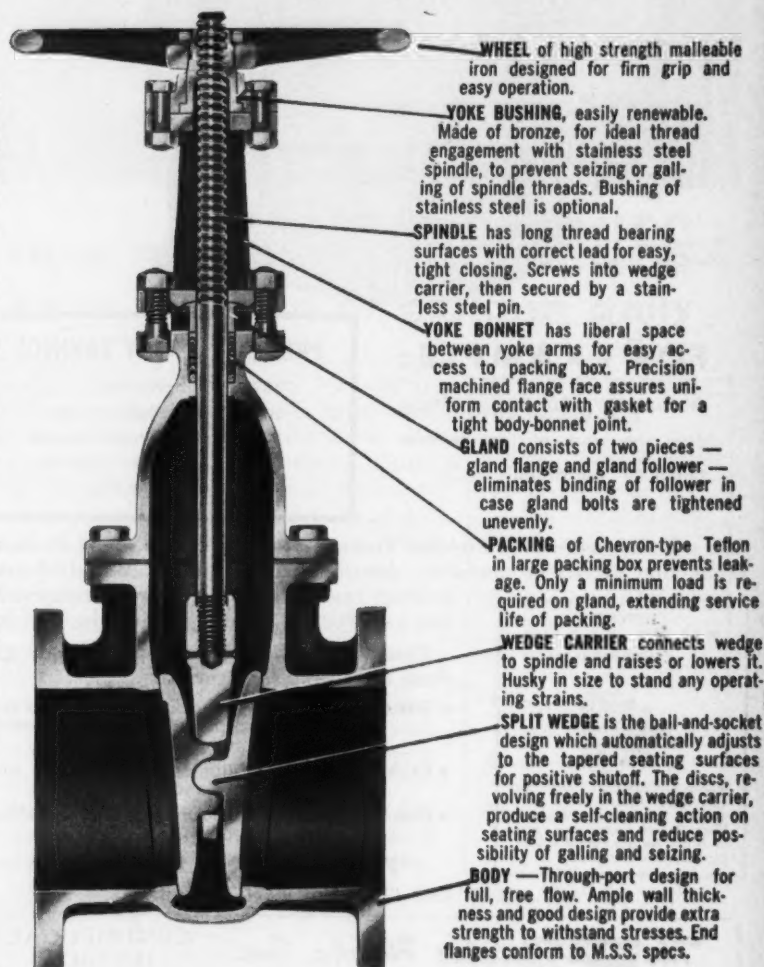
This picture shows the many points of excellence in the design and construction of Jenkins Fig. 1327 Split Wedge Stainless Steel Gate Valves. Compare them with any valve you know. You'll conclude that it's hard to beat Jenkins at making valves, no matter what the material.

But no picture can show the quality of the castings . . . the precision machining . . . the rigid inspection and testing that have gone into this valve. All of these are as important as design and metal alloys in assuring long, dependable, economical valve service. And, all of them are up to the peak standards for which Jenkins has been known for almost a century.

SEND FOR NEW CATALOG of Jenkins Stainless Steel Valves. You'll find in it the patterns you want, in a choice of alloys that satisfy the requirements of practically all corrosive services. Also, you'll see that these Jenkins valves meet valve industry specifications and the high standards established by the leading users of stainless steel valves. Jenkins Bros., 100 Park Avenue, New York 17.



Sold Through Leading Distributors Everywhere



JENKINS BROS., 100 Park Avenue, New York 17, N. Y.



☐ Send the new stainless steel valve catalog

☐ Have a representative call on me

NAME & TITLE.....

COMPANY.....

ADDRESS.....

Check 2863 opposite last page

FLETCHER ~~TORNADO-MATIC~~

THE ONLY CENTRIFUGAL
THAT CAN CUT COSTS
LIKE THIS—



COMPLETELY
AUTOMATIC

Bottom
Discharge →

FOR EXAMPLE:

this one 48" x 30" Tornado-Matic
does the work of two conven-
tional 40" centrifugals →

PROVIDES 5-WAY SAVINGS

100%	labor costs
50%	installation costs
50%	space requirements
75%	power to operate
25%	initial outlay

The new fully automatic Fletcher Tornado-Matic gives you round-the-clock production. Needs no operators. Assures absolute quality control of your product because of uniform production cycles. See page 708 in Chemical Engineering Catalog.

Fletcher Tornado-Matic unloader gives you these extra *exclusive* features.

- **Contamination-Free** . . . No lubricants to leak or seep on product. No teeth on which product can catch.
- **Flexible Operation** . . . Fully adjustable as to pressure and speed.
- **Power Packed** Smooth unloading of difficult products.

Also available in manual and semi-automatic models
F/M variable speed drive zero to maximum RPM

ASK ABOUT THE FLETCHER RENTAL PLAN

FLETCHER PILOT PLANT CENTRIFUGAL



Rugged, compact machine combines functions of extractor, separator and clarifier. Results from this test unit can be accurately scaled up to production unit.

The New Fletcher Works, Inc.

CENTRIFUGAL
DIVISION

201 Glenwood Avenue • Philadelphia 40, Pa.

Send me additional information on the Fletcher Tornado Centrifugal

NAME & TITLE

ADDRESS

COMPANY

CITY & STATE

Check 2864 opposite last page



PROCESS INSTRUMENTATION
AND LABORATORY APPARATUS



At Hoffmann-LaRoche, Inc., ethical pharmaceutical research required high-pressure reaction facilities. Recently completed installation is truly a . . .

SAFETY is the keynote in recently completed eight-cubicle, high-pressure laboratory at Hoffmann-LaRoche, Inc., Nutley, N.J. Carefully built into structural design are a series of basic safety checks which function as part of an efficient and integrated system.

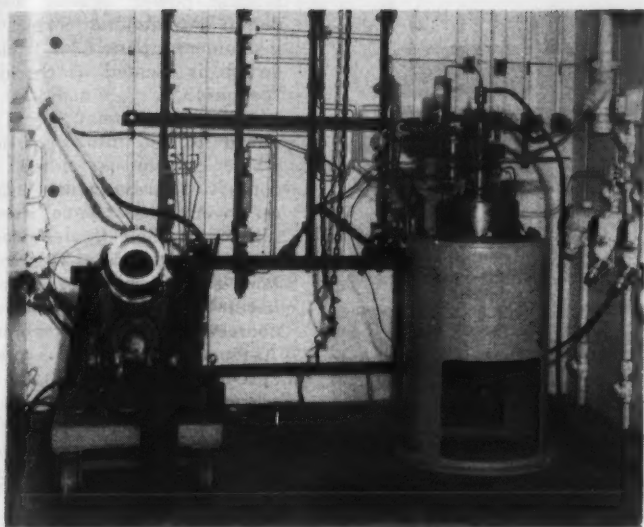
Designed for research in organic synthesis reduction reactions in the field of ethical pharmaceuticals, this laboratory is equipped to handle pressures up to 5000 psi at temperatures from -50 to +175°C. Careful attention is given to personnel and equipment protection combined with a high degree of technical flexibility.

Each of four corridors provides access to a pair of cubicles. During activation, cubicle doorway is closed off by

a blow-out proof sliding door of ½" steel plate. Fans are mounted in back wall of each cubicle and a flexible ventilating hose may be moved directly above each vessel during charging, emptying, or operation. A separate drain from each cubicle prevents spread of any ignited solvents or vapors.

Gas Service Safety

Gas service lines originate from barricaded cylinder storage rooms located at each end of building. Two-room setup keeps hazardous gases separated and helps reduce possible supply line congestion. Distribution is by means of a manifold system running beneath roof eave at back wall. Each cubicle receives its own gas requirements from out-



Control panel for one of eight cubicles at Hoffmann-LaRoche's high-pressure research laboratory. Lab has built-in safety to afford maximum protection for personnel and property

Two-vessel cubicle. High-pressure gas manifold can be seen on back wall. Entire system is designed for safety

High-pressure research laboratory designed for safety

side building thus eliminating possible danger of fire or explosion being transmitted through distribution conduits in cubicle floors.

Various safety devices are incorporated in distribution system. Each cylinder is fitted with a five-micron pore-size filter. Gas lines to each cubicle are protected against reverse flow by a positive-sealing check valve fitted with a Teflon O-ring seal in poppet.

Gage protectors installed within cubicles transmit pressure hydraulically to gages in control area. If a Bourdon tube should burst, a small spurt of oil is released and protector automatically seals off against escape of dangerous fumes or gases. Same method is used with respect to vessel gages and pressure recorders mounted on instru-

ment panels. No gas lines enter control area.

In six cubicles provided with hydrogen service, air is monitored by a combustible gas detection unit. A 40% LEL (lower explosive limit) of hydrogen gas will cause an alarm to sound and activate warning light at instrument panel. A second setting, at 70% LEL, closes a separate full-safe explosion-proof solenoid valve at both high- and low-pressure hydrogen gas sources.

Personnel Safety

Special attention has been given to personnel safety throughout the installation. Three switches are provided for each agitator motor. While an operator is inside the cubicle he can exercise full con-



How Ansco's 101 NEPTUNES save millions of gallons daily

Snapshots at popular prices depend to an amazing extent on water. Ansco Manufacturing Company, Binghamton, N. Y., needs many million gallons every day...water for vital heating, cooling, air conditioning...expensively treated water for chemical processes.

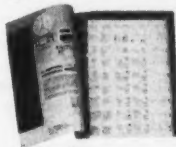
Cutting water costs to the bone, Ansco has found ways to re-circulate and re-use water an average of $2\frac{1}{2}$ to 3 times before it is reluctantly released.

Key to the program is metering. Over 100 Neptune water meters keep guard 24 hours a day. Each department is charged for the water it uses. The meters help compute heating and cooling values, blending proportions, chemical treatment required, etc., for most economical re-use.

If water is important to you, make sure you too are saving all you can with meters. We'll gladly make a survey. No obligation, of course.

Life History of a Gallon of Water at Ansco

1. Well water at 53° used first for air conditioning
2. Chlorinated, used for spray washing
3. Used in chemical dehumidifier
4. Passes through heat exchanger
5. Passes through ammonia condenser
6. Goes to fire protection reservoir
7. Finally used to cool roof



GET THE FACTS

Ask for helpful
Meter Data
Bulletin 566 MP
See Neptune Data
Pages in Chemical
Engineering Catalog.

neptune

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NEPTUNE METER COMPANY

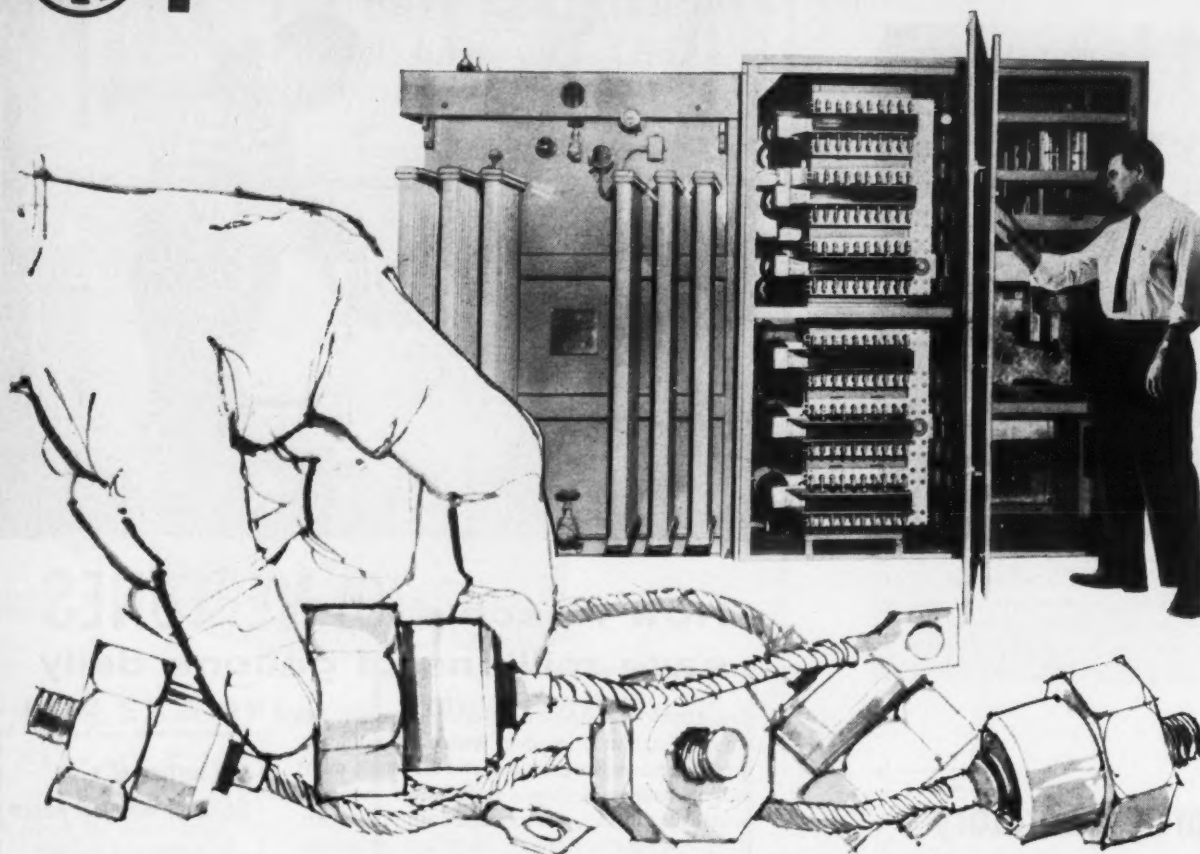
19 West 50th Street • New York 20, N.Y.

Check 2865 opposite last page



I-T-E CIRCUIT BREAKER COMPANY

INSTRUMENTS & LAB



THE ONLY RECTIFIER

PERMITTING RANDOM CELL SELECTION

I-T-E Unitron Semi-Conductor Rectifier lets you use any cell in any position

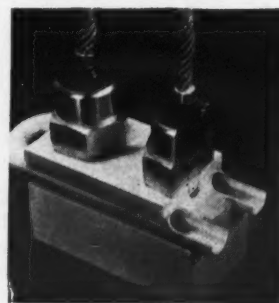
Only the I-T-E Unitron Semi-Conductor Rectifier has this advantage. Instead of having to code cells for use in various positions, you can select them at random. The unique I-T-E voltage divider circuit maintains equal inverse voltage on all cells. So they have greater assurance of long life.

This ingenious voltage divider circuit uses no parallel-connected resistors that drain power. A small transformer does all the work. It takes no power and needs no maintenance. In case of a cell failure, sensing devices respond instantly and register the failure on the control panel.

Recent AIEE papers cover this and other features of the I-T-E Unitron Semi-Conductor Rectifier in

considerable detail. For your copies and further information, consult your local I-T-E representative. Or write I-T-E Circuit Breaker Company, Transformer & Rectifier Division, 1900 Hamilton St., Philadelphia 30, Pa.

Unique cooling system ... saves you money. Ordinary tap water is continuously purified and circulated close to cells. Picture of bus section at right shows how compactly this is done. No need to drain system to change cells.



trol over motors by means of locking power against accidental activation of switch at instrument panel. A third switch is located at corridor "peephole."

Another automatic safeguard is set into operation when cubicle is closed. A contact is made which lights up on instrument panel showing that cubicle is closed and ready for operation. This contact is also in series with a normally open pressureless contact in pressure recorder. As soon as a vessel is pressured, recorder contact is closed. Should operator reopen cubicle door with vessel still under pressure, an alarm rings, warning him not to enter.

Adjustable high-limit contacts on both pressure and temperature recorders turn off heaters and motor should either setting be reached during operation.

Building Construction

Building is constructed of reinforced concrete with staggered grids of reinforcing rods, on six inch centers, imbedded in each face of 16-inch front walls, 12-inch side walls, and roof. A 12-inch reinforced back wall protects four corridors against reflected shock wave and ricocheting fragments.

Blow-out is directed at a dirt embankment 12 ft from back wall. It rises at a 45° angle to a height of 24 ft.

Entrance to corridors is through ½ inch steel-plate hinged doors.

(High pressure laboratory was designed and constructed by Wigton-Abbott Corporation, Plainfield, N.J.)

Check 2867 opposite last page.

(Combustible gas alarm system is a product of Davis Emergency Equipment Co., Inc., 47 Halleck St., Newark 4, New Jersey.)

Check 2868 opposite last page.

(Pressure piping and gas distribution system are products of Pressure Products Industries, Inc., 412 W. Warminster Rd., Hatboro, Pa.)

Check 2869 opposite last page.

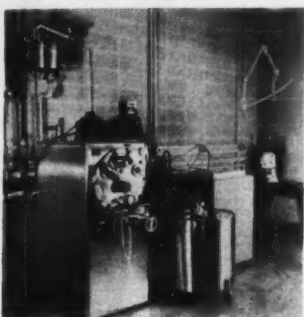
Check 2866 opposite last page

**Microorganism culturing
in continuing process
with set conditions**

Chamber heat within
 $\pm \frac{1}{2}^{\circ}\text{C}$ in 20-85°C range

Uses: Provides for continuous culture of microorganisms under selected constant conditions.

Features: Physiological state, as well as concentrations of all chemical constituents in medium, remains constant. Temperature - control



Microorganism cultivator incorporates cycle for sterilization of internal mechanism and liquid-culture medium, prior to inoculation

circulating-water system permits chamber heat to be maintained within $\pm \frac{1}{2}^{\circ}\text{C}$ in range of 20 to 85°C.

Description: Unit consists of double-walled cylindrical chamber. It is 16" in diameter and 30" long, housing rotating agitator with fins.

Cycle is provided for sterilization of internal mechanisms and liquid culture medium, prior to inoculation.

All parts which come in contact with culture medium are made of low-carbon stainless steel. Temperature, agitator speed, and sterilizing controls are located on front control panel.

(Biogen is product of American Sterilizer Co., Erie, Pa.)

Check 2870 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip.



new
from
Foxboro

**ABSOLUTE PRESSURE d/p CELL TRANSMITTER
with full-power 3-15 psi signal**

Now there's a Foxboro d/p Cell designed specifically for low pressure measurement and transmission. It's the new Type 13AA Absolute Pressure Transmitter.

One side of the 13AA is evacuated, providing an absolute zero reference for the measurement of any process pressure. The 3-15 psi output signal has ample power for direct operation of standard receiver recorders and controllers.

This transmitter is simple in construction for trouble-free service. It

provides for easy draining, steam tracing, and cleaning by regular maintenance procedures. Type 316 S.S. construction. Positive overrange protection to 1500 psi.

The 13AA Absolute Pressure Transmitter is ideal for use with such process equipment as low pressure fractionating columns, evaporators, and vacuum crystallizers. Ask your Foxboro Field Engineer for detailed information, or write for Bulletin 458-22A. The Foxboro Company, 817 Neponset Ave., Foxboro, Mass.

Specifications:

Range Spans: Adjustable
100 to 450 and 400 to
1500 mm of mercury

Output: 3-15 psi or 0.2 -
1.0 kg/cm²

Accuracy: 0.5 percent of full
scale span on most ranges

FOXBORO

REG. U.S. PAT. OFF.

process instrumentation

Check 2871 opposite last page

**Automatic purification
of organic salts
by freezing**

Melting points of 50-300°C
can be handled

Uses: Purification of organic compounds difficult to refine by conventional methods.

Feature: Refiner automatically purifies any material that melts between 50 and 300°C.

Description: Material to be purified is placed in glass tube held by adjustable mounting. Tubes from 4 to 22 mm OD can be held in apparatus which can be modified to accept capillaries.

Tube is encircled with Ni-chrome ribbon which is clamped to terminals on motor-driven carriage. When power is turned on, material inside heater tube melts.

As carriage carrying heater moves along tube, melted



Zone refiner has two heaters and air-blast rings to permit double-purification effect when desired

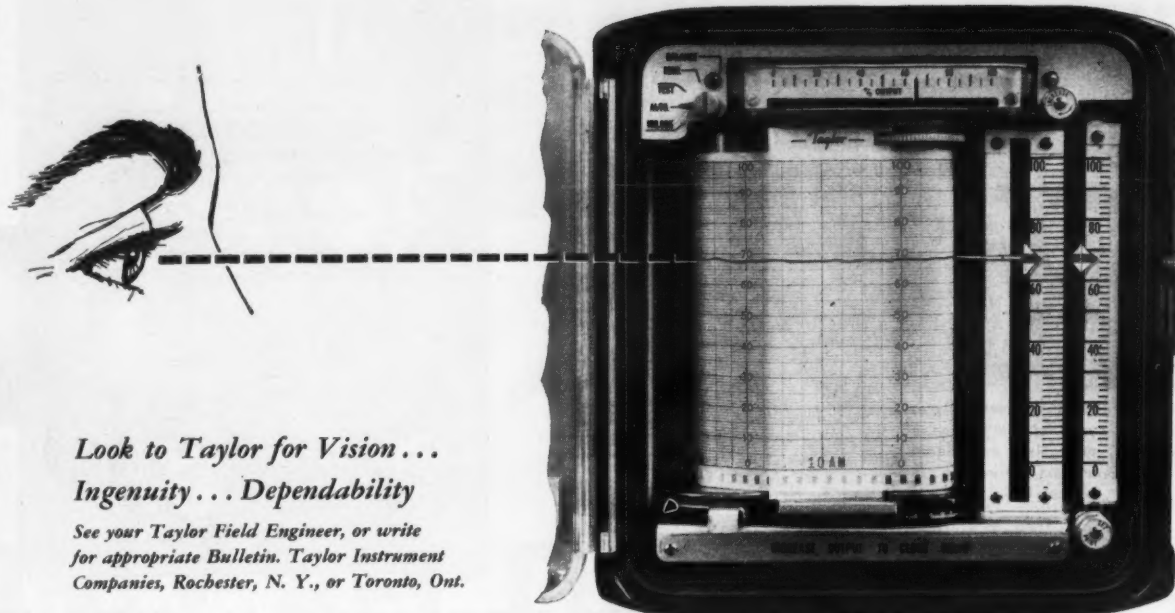
zone moves with it. Air-blast ring, mounted on carriage behind heater, cools tube so that melted reagent solidifies again.

As melted zone passes along tube, impure material melts in front and pure crystals freeze out behind it. In this manner impurities are gradually concentrated in liquids, and swept with melted zone to one end of tube.

Second heater and air-blast ring are mounted on carriage behind first pair so that second zone may follow first. Positions of heaters and air blast can be adjusted to give

UNCONFUSED

in both Electronic and Pneumatic

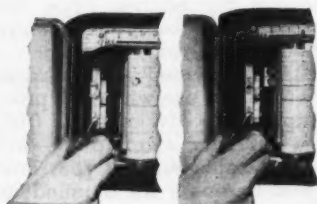


*Look to Taylor for Vision . . .
Ingenuity . . . Dependability*

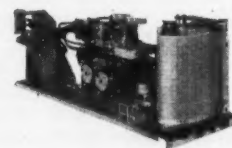
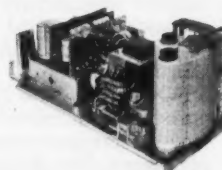
See your Taylor Field Engineer, or write
for appropriate Bulletin. Taylor Instrument
Companies, Rochester, N. Y., or Toronto, Ont.

701J AC or DC Electronic Recorder

Compare these features . . . common to the 701J Electronic



1. A Taylor 'first'. On both Electronic (left) and Pneumatic (right) instruments, controller response adjustments are quickly and easily made from the front, where results can be watched. You can visualize immediately all pertinent process information — chart, pen and set-point.



2. All major components plug in. Even individual amplifier circuits plug in. You can service all components and still stay on control. AC and DC Recorders are completely transistorized; unaffected by a supply voltage change up to $\pm 10\%$.

Taylor Instruments

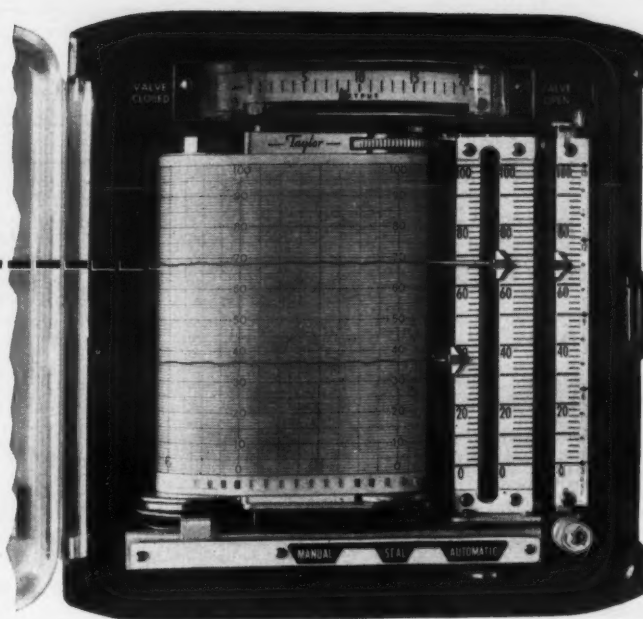
READABILITY

instrumentation by Taylor

- Simplest scanning of all . . . because chart record, pen and set-point are side-by-side.
- Invites frequent reading . . . because target-type pens and pointers are easiest of all to see, even at a distance.

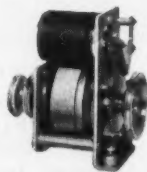
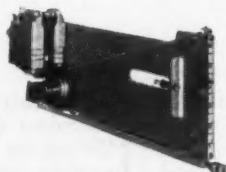
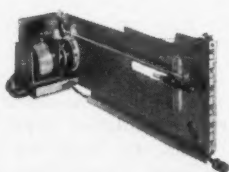
- Operators make fewer mistakes . . . because all pertinent data is lined up.
- You read the 4" chart from left to right—like a newspaper—on rectangular coordinates.
- All these features in a 6" x 6" cutout.

*Reg. U.S. Pat. Off.



90J TRANSCOPE* Pneumatic Recorder

AC or DC Recorder and the 90J TRANSCOPE Pneumatic Recorder



3. Plug-in Set Point Transmitters, parallel to and exactly matching chart range, permit comparison without confusion and accurate adjustment of the control point. They can be removed for checking with only momentary interruption of record.

4. Powerful Servo Motors give more precise pen positioning than ever before. More accurate records. Unmatched threshold sensitivity. Unparalleled power permits use of process alarms, new inking system and elimination of flimsy linkage.

MEAN ACCURACY FIRST

Check 2872 opposite last page

INSTRUMENTS & LAB

zone widths from 1/4 to 2".

Apparatus takes 10 x 15" of bench space and stands 34 1/2" high. Full-height door inside makes mechanism easily accessible. It operates on 115 v 60-cy AC.

(Zone refiner is product of Fisher Scientific Company, 717 Forbes St., Pittsburgh 17, Pennsylvania.)

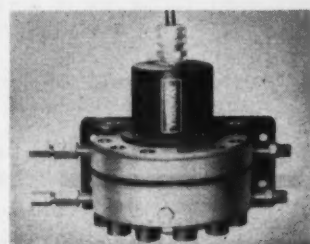
Check 2873 opposite last page.

Broad range adjustment in differential-pressure transmission

Only connections required are two small tubes

Uses: Remote indication of differential pressures in liquid vessels and fluid lines.

Features: Unit may be installed on new or existing equipment. Two small tubes are only connections required. Instrument has broad range adjustment without al-



Differential-pressure transmitter is connected to liquid vessel, fluid line, or other container by two tubes

teration or replacement of working parts.

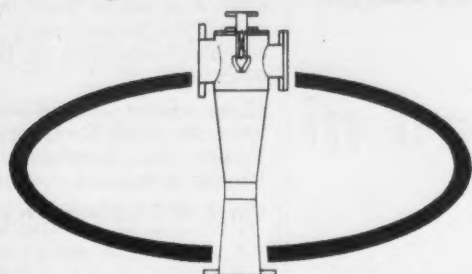
Description: Differential-pressure transmitter consists of pressure housing containing diaphragm mechanism and sensing coil, to operate remote receiver.

Tube connections lead to opposite sides of diaphragm. Variation in differential pressure on diaphragm causes change in outlet of sensing coil which is transmitted to remote receiver.

(Differential-pressure transmitter is product of Yarnall-Waring Company, Chestnut Hill, Philadelphia 18, Pa.)

Check 2874 opposite last page.

CROLL-REYNOLDS *Jet-Venturi*



Fume Scrubbers

*minimize odors
clean and purify air
and other gases
without fan or blower*



ADDITIONAL APPLICATIONS

*to recover valuable solids
use as Jet Reactors*

SEND TODAY FOR COMPLETE CATALOG



Croll-Reynolds CO., INC.

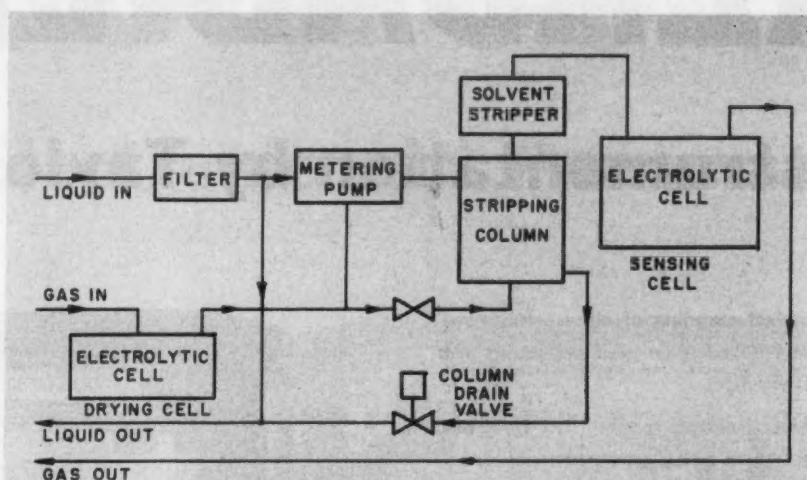
Main Office: 751 Central Avenue, Westfield, N. J.

New York Office: 17 John Street, N. Y. 38, N. Y.

CHILL-VACTORS • STEAM-JET EVAPORATORS • AQUA-VACTORS
FUME SCRUBBERS • SPECIAL JET APPARATUS

Check 2875 opposite last page

PROCESS INSTRUMENTATION and LABORATORY APPARATUS



Principle of Operation

Analysis is accomplished by removing moisture from sample liquid and quantitatively absorbing and electrolyzing water in electrolytic cell. Electrolysis current is directly related to mass rate of flow of water into instrument. Because liquid-sample-flow changes would affect

reading, precise liquid-metering pump is used. Moisture in liquid is completely removed in falling film or packed column by counter-current flow of stripping gas. This is then passed over electrolysis cell. Sample flow system of liquid moisture monitor is shown.

Electrolytic-type monitoring instrument gives one-ppm sensitivity and $\pm 5\%$ accuracy in providing . . .

Continuous readout of moisture in liquids

Uses: Provides continuous readout of moisture in many liquids, including catalytic reformer feeds, metal-cleaning-system solvents, transformer oils, and refrigerants.

Features: Quantities as small as one part-per-million can be detected to an accuracy of better than $\pm 5\%$. Instrument provides continuous readout of this information in ppm on meter.

Description: Liquid moisture monitor consists essentially of metering pump, stripping column, and electrolytic cell. It operates on electrolytic coulometric principle, which has been used for obtaining analysis of moisture in trace or percentage quantities in gas.

Adaptation of this method to monitor-

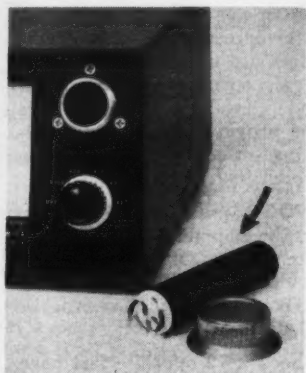
ing moisture in liquids necessitated placement of stripping column ahead of electrolytic cell. Thus, dry stripping gas removes moisture from liquid. Quantity of moisture accumulated by gas is then analyzed in cell. Metering pump fills need for control of small liquid flow to column. It also permits fast bypass flow.

Basis of system is electrolytic cell. Liquid flow from stripping column into cell is held constant. Since flow of current is directly proportional to mass flow rate of water into cell, electrolysis current is proportional to moisture content of gas. Any water vapor present in sample is absorbed and electrolyzed simultaneously to hydrogen and oxygen.

Cell consists of tube with pair of close-

ly spaced platinum wires wound in double helix on inner surface. Space between wires is coated with viscous film of partially hydrated phosphorous pentoxide. DC voltage is applied to elements of cell. Current is measured via multi-range meter.

In stripping column, liquid trickles down internally threaded grooves. Stripping gas (any inert dry gas with moisture content of less than 500 ppm) passes from bottom to top through center of column, thus pulling moisture along. Second electrolytic cell



Heart of liquid moisture monitor is electrolytic cell (indicated by arrow), which has been removed from unit here

is utilized to remove moisture from stripping gas, prior to stripping of moisture from liquid by gas.

The 10-port valve, utilized as metering pump, operates by rotation so that alignment of ports is alternated. Valve is rotated by cyclic timer driven by synchronous AC motor.

Analyzer unit, including all sample-handling equipment, is mounted in weather-proof and explosion-proof housing. Control can be remotely located.

Eight-position selector switch on control panel provides full-scale attenuation ranges of 1000, 300, 100, 30, and 10 ppm.

(CEC 26-312 moisture monitor is development of Consolidated Electrodynamics Corporation, 300 N. Sierra Madre Villa, Pasadena, Calif.)

Check 2876 opposite last page.



green area is actual size silhouette of the new M/44

a compact, low-cost INDICATING TEMPERATURE TRANSMITTER

engineered for fast, sensitive response under roughest field conditions — uses any filled thermal system.

Here's a brand new instrument engineered specifically for its job of indicating and transmitting temperature.

The M/44 Indicating Temperature Transmitter offers the inherent simplicity of a motion balance instrument. Compact and lightweight (10 lbs.) its indicating scale and fluorescent red pointer are visible up to 20 feet away. The output pressure of the M/44 is transmitted to any remote 3-15 psi recorder, controller, or indicator.

The M/44 is made with standard performance-proved Foxboro components, simply and conveniently arranged in a weather proof steel case. Changing range or type of thermal system can easily be done in your own plant.

Thanks to its rugged construction, the new M/44 is unaffected by vibration, sudden shock, or corrosive atmosphere. Even in the event of air supply failure, this instrument continues to indicate process temperature.

Ask your Foxboro Field Engineer about this new instrument. Or write for Bulletin 13-28A. The Foxboro Company, 817 Norfolk Street, Foxboro, Mass.

CHOICE OF THERMAL SYSTEMS

Foxboro M/44 Transmitters are available with any filled thermal system. These classes are suggested for particular range characteristics:

Class II Vapor Pressure (100° to 600°F)

Lowest cost, fastest response, highest sensitivity. Recommended for all installations within this range except when the measured temperature crosses ambient temperature.

Class IA & IB Liquid Expansion (—250° to +600° F)

Good response, good sensitivity, uniform scale. Uses smallest bulb of any filled thermal system.

Class III Gas Pressure (—450° to +1000° F)

Applicable to ranges beyond the limits of other filled systems. Uniform scale. Bulb has long sensitive section; permits useful averaging measurements.

FOXBORO
REG. U.S. PAT. OFF

**TEMPERATURE MEASUREMENT
AND CONTROL**

Check 2877 opposite last page

Announcing
the new
GLAS-COL
Desiccator
heating
mantle



... it assures even heating which minimizes chance of thermal strain to glass vessels.

... it provides an effective shield for personnel in the rare instances when glass vessels do collapse.

This new, aluminum-housed electric heating mantle is specifically designed for heating heavy-walled vessels in which vacuums must be created to permit the drying of various samples.

As a result of the high pressure due to conditions of high vacuum, heavy-walled vessels occasionally collapse. When such accidents happen, the Glas-Col aluminum-housed heating mantles provide a very effective shield to protect personnel from flying glass and chemicals.

Glas-Col mantles have been used to heat desiccators for several years ... with *complete* success.

Glas-Col Desiccator mantles are priced from \$45.00 to \$57.00

Catalog No.	Desiccator Flange Diameter	Watts (115 Volts)	Price
M-200	160 mm	330	\$45.00
M-202	200 mm	380	57.00
M-204	250 mm	380	57.00

Glas-Col Apparatus Company
Dept. CP, 711 Hulman Street, Terre Haute, Indiana

... the world's largest manufacturer of heating mantles

U.S. Patents
2,282,078
2,739,220
2,231,606 and
2,739,221

GLAS-COL

**ELECTRIC
HEATING MANTLES**

A complete line for laboratory,
pilot plant, and chemical process
heating applications.

INSTRUMENTS & LAB

Computer programs made for later use

Writing of computer programs, by personnel with relatively little experience in field, has been made possible by development of an automatic programming system.

System was developed for use with manufacturers' digital computer. Device compiles optimum machine-language program and reproduces it for later use.

Compiler operates on fixed-point numbers. Data is handled in decimal form, with numbers of seven digits, positive or negative.

Seventeen accumulator registers are available. Scale factor is specified in instruction code. Twelve index registers are provided for use in modifying effective addresses on which instructions act.

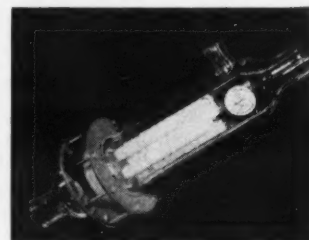
(POGO programming system is development of Bendix Computer Division, Bendix Aviation Corporation, 5630 Arbor Vitae St., Los Angeles 45, Calif.)

Check 2879 opposite last page.

Filtration instruments have glass bodies

Uses: Contamination-control applications.

Features: Instrument bodies consist of Pyrex brand glass.



Glass filtration instruments can operate with fluids in temperature range of -65 to $+450^{\circ}\text{F}$

This permits wide range of heat and mechanical-shock loading.

Description: Models are available in 1, 1½, and 2" line sizes. Designs for in-line, angle, or back-flush types are available. Flanges are designed to meet ASME stand-

Check 2878 opposite last page

CHEMICAL PROCESSING

ards. They can be modified to mate any glass-pipe system.

Maximum working pressure for standard models is 50 psig, with proof pressure of 75 psig. Fluid-medium temperatures can be in range of -65 to $+450^{\circ}\text{F}$, with shock conditions of $100^{\circ}\text{F}/\text{min}$. Flow characteristics permit maximum of 15-psig pressure differential.

(Glass filtration instruments are product of Pyro-Flo, Inc., 416 N. Glendale Ave., Glendale, Calif.)

Check 2880 opposite last page.

Industrial thermometers

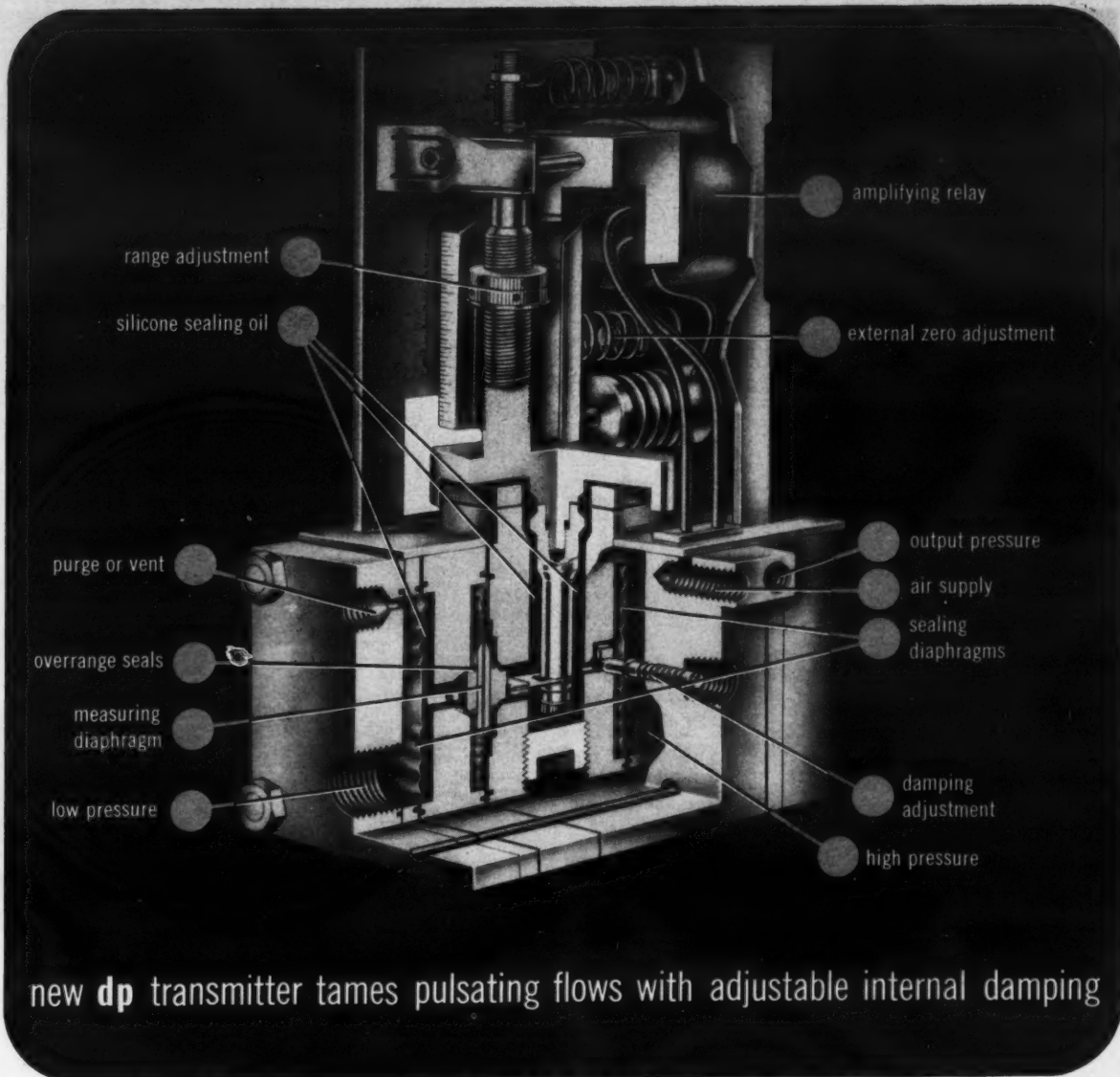
... are available with variety of stem lengths. Three styles are obtainable.

Dished dials are incorporated in design of two models — four-inch-dial industrial and four-inch-dial maximum-set hand types. Also in this line is three-inch-dial straight-form industrial style.

Four-inch-dial maximum-set hand model utilizes maximum-reset pointer, set to register maximum or minimum temperatures. This type has application in detection of occurrence and degree of overload in power or distribution transformers.

(Industrial thermometers are product of Rochester Manufacturing Company, 100 Rockwood St., Rochester 10, N. Y.)

Check 2881 opposite last page.



new dp transmitter tames pulsating flows with adjustable internal damping

Not long ago, F & P engineers set about building a better differential pressure transmitter. Their main purpose: to obtain dp transmitting of the highest accuracy and dependability by providing adjustable internal damping, maintenance-free operation, and superior calibration stability. Their design approach: keep the process fluid out of the measuring system.

An examination of the illustration above reveals how the input pressures, applied to the sealing diaphragms, are transmitted to the measuring diaphragm by silicone sealing oil. Adjustable internal damping is achieved by a needle valve which restricts the flow of sealing oil. This ensures fast response to full changes in differential

pressure, yet isolates the force balance system from extraneous impulses. Pulsating flows present no problems for this transmitter. And since the needle valve is in the clean sealing oil, its operation is trouble free, regardless of the amount of damping required.

The unique and revolutionary design of this new dp transmitter makes it well worth investigating. Contact the F & P field engineer nearest you for a demonstration or evaluation unit, or write for Catalog 10B1465. Fischer & Porter Company, 2979 County Line Road, Hatboro, Pennsylvania. In Canada, write Fischer & Porter (Canada) Ltd., 2700 Jane Street, Downsview, Ontario.



FISCHER & PORTER COMPANY • complete process instrumentation

Check 2882 opposite last page



* A PROCESSING PROFILE

Improve Quality with Swenson Processing Equipment

Quality conscious, this leading salt manufacturer also keeps a sharp eye on production costs. Keyed to fit both demands, their Swenson Quadruple-Effect Evaporator is producing hundreds of tons of salt daily. Specifically designed for this application and utilizing proper materials of construction, this evaporator provides longer production runs, less downtime!

What Whiting's Swenson Evaporator Division did for this manufacturer can be done for you. Send for "Processing Profiles," the colorful new booklet of performance reports, showing evaporators, crystallizers, filters, pulp washers and spray dryers *on the job* ... helping up-to-date processors do more, faster and better. *Swenson Evaporator Company, 15620 Lathrop Ave., Harvey, Ill.*

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

SWENSON

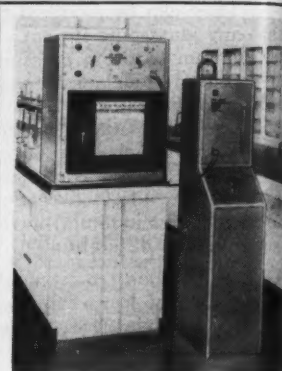
Proved engineering for the process industries since 1889



WHITING—MANUFACTURERS OF CRANES, TRAMBEAM HANDLING SYSTEMS, TRACKMOBILES, FOUNDRY AND RAILROAD EQUIPMENT

Check 2883 opposite last page

INSTRUMENTS & LAB



Gas-liquid chromatograph

... employs ionization detector system, permitting detection of as little as 2×10^{-11} moles of most organic substances. Degree of control is set solely by column requirements.

Since instrument accepts samples as small as 0.025 microliter, column overloading is prevented. Efficiencies of over 1000 theoretical plates per column foot are obtained. Analysis time is reduced through use of short high-efficiency columns. Only single calibration curve is required for most molecular species.

Instrument is produced by W. G. Pye & Co., Ltd. of Britain.

(Pye Argon chromatograph is marketed in North America by Jarrell-Ash Co., 26 Farwell St., Newtonville 60, Mass.)

Check 2884 opp. last page.

Logging system of automatically programmed remote-indication type, designed to operate in conjunction with space-code-selector supervisory equipment, is presented in eight-page Bul GET-2925 — General Electric Company, Schenectady 5, N. Y.

Check 2885 opposite last page.

Dissolved-oxygen meter components are shown in three bulletins. Contact sampler, analyzer, and recorder are outlined in Buls 58-B627, 58-B631, and 58-B771 — The Hays Corporation, Michigan City, Ind.

Check 2886 opposite last page.

CHEMICAL PROCESSING

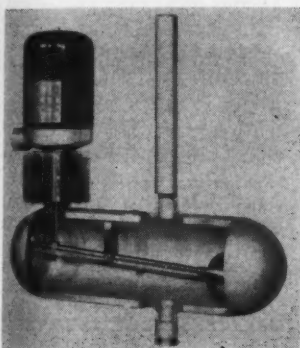
Liquid-level control for high pressures, temperatures

External-float-cage unit has
all-welded design

Uses: In high-pressure high-
temperature level control.

Features: Liquid-level controller has external-float-cage unit of all-welded design. Switch mechanism will operate safely, even though liquid temperatures reach 1000°F.

Description: Unit mounts by means of two beveled welding



Switch mechanism of liquid-level control will operate safely even though liquid temperature reaches 1000°F

nipples of one-inch Schedule-80 pipe. Body of controller is formed from two sections of five-inch Schedule-80 seamless alloy-steel pipe (ASA 335 Grade P-11).

Three-inch-diam float is of heavy-gauge Type 316 stainless steel. Float is heli-arc welded to counter-weighted float stamp.

Instrument will operate with liquids of 0.65 specific gravity (at operating temperature) and up. Following table indicates the temperature-pressure ratings of controller:

Temperature, °F	Unfired pressure-vessel code rating, psi
-20 to +800	1668
850	1600
900	1455
950	1222
1000	867

(Model 402 liquid-level control is product of Magnetrol Inc., 2110 S. Marshall Blvd., Chicago 23, Ill.)

Check 2887 opposite last page.



... "Frictionless" design gives
**Flexotrol* longest life,
stability and accuracy of
any displacement level controller**

By avoiding knife edges, bearings and associated pressure-tight mechanical fittings, K & M has achieved almost frictionless operation in the *Flexotrol* Displacement-Type Liquid Level Controller. As a result, errors due to friction, distortion and hysteresis are practically nil.

Actuation is accomplished through a torque element which directly transfers displacer movement to the controller. There are no intermediate levers. Because the rotation of the tube is limited (4°) and because the whole assembly is constructed of high-durability materials, the torque systems has remarkable fatigue resistance. Tests in excess of five million operating cycles have produced no detrimental fatigue effect.

The controller unit utilizes conventional 3-15 psi signal air pressure, has a 0-150% adjustable proportional band, may be direct-, reverse- or snap-acting without parts change. The *Flexotrol* Level Controller can also be converted to a transmitter-controller combination. Automatic reset and rate response are optionally available.

Full details are given in Bulletin
456-1. A copy is yours for the asking.



*Flexotrol is a trade-name of Kieley & Mueller, Inc.

K&M

diaphragm control valves

Our 80th Year

S.A. 1935



KIELEY & MUELLER, INCORPORATED

Oldest Pressure and Level Control Valve Manufacturer
64 Genung Street, Middletown, New York

Check 2888 opposite last page

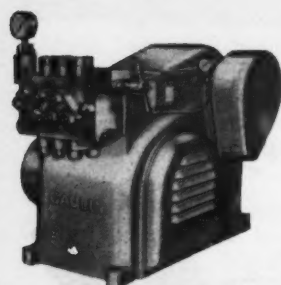
If you Disperse, Emulsify, Blend
Particles or Pump, Control, Move Liquids

...GAULIN GTA*

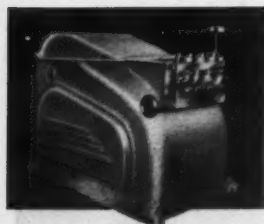
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Homogenizers, Sub-Micron Dispersers, and colloid mills produce uniform stable emulsions and dispersions of ultimate fineness.



Triplex Pumps and HX Pumps handle large volumes for transfer, metering or spray drying.

Homogenizers H-55, Laboratory Homogenizers LH-55, Sub-Micron Disperser SMD-55, Colloid Mills C-57, Triplex Pumps P-55, HX Pumps HX-57.

*Gaulin Technical Assistance starts with the GTA library of product information. Ask for all or specific bulletins on each piece of equipment. Then, call on Manton-Gaulin for specialized Technical Assistance to bring you experienced advice and factual data on the best method to mix or move your product. This GTA combination will save you time when planning and save money when buying.



55 Garden Street, Everett 49, Mass.

World's largest manufacturer of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills

Check 2889 opposite last page

INSTRUMENTS & LAB

**Steady-stirring-action
speed is controlled
without governor**

Unit pivots to permit stirring at various angles

Uses: Stirring highly viscous liquids at high or low speeds.

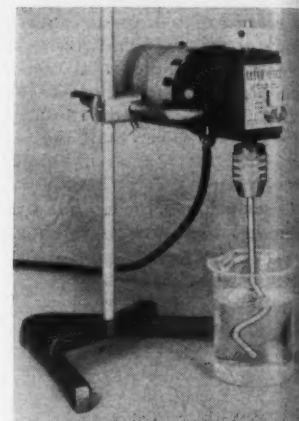
Features: Stirrer provides consistent stirring action at selectively controlled speeds in range of 100 to 1500 rpm. Speed is regulated on control knob on face of motor without governor or rheostat.

Unit has special rod for mounting in right-angle clamp on support stand. This permits pivoting of the unit for stirring at various angles.

Description: Stirrer is powered by 1/50-hp induction motor. High torque transfer permits stirring of viscous liquids at full speed. Torque increases when speed is reduced, thus providing added

power when it is needed.

Unit is equipped with three-jaw Jacobs'-type chuck for quick change of metal or glass stirring rods. Rods have diameter range of 1/4 to 3/8



High torque transfer of stirrer permits stirring of viscous liquids at full speed. Torque increases when speed is reduced

here is the world's smallest and simplest
strip chart recorder!



- AMPLIFIED STORAGE: Contains 63-ft. chart roll, or 31 days' recording at one inch per hour. Useful chart width 2 1/4".
- ACCURATE: Galvanometer pointer swings free for maximum accuracy, being clamped briefly for marking.
- INKLESS: Recording process is completely dry, utilizing special pressure sensitive paper. Method provides remarkable definition.
- RECTILINEAR: Advanced design provides true rectilinear recording free from distortion.
- RELIABLE: Positive synchronous motor drive with sprocket engaging holes in paper for accurate time indication.
- VERSATILE: Portable or panel mounting models. Stocked in a variety of scales and chart speeds.

WRITE TODAY FOR LITERATURE

rust industrial co., inc.

130 Silver Street, Manchester, N. H.

Check 2890 opposite last page

* Subject to
change without
notice.

CHEMICAL PROCESSING

inches. Stirring rod is mounted in hollow shaft with gripping and centering mechanism to help maintain alignment, reduce whipping, and permit fast and easy adjustment to desired height.

Induction-type motor contains no spark-producing brushes, thus eliminating explosion danger. Motor operates on 115v 50/60-cy AC.

(Laboratory motor stirrer is product of Central Scientific Company, 1700 Irving Park Road, Chicago, Ill.)

Check 2891 opposite last page.

Description: Flow indicator consists of synchronous motor-driven digital counter. This is actuated by energy from photo cell.

Card- or tape-printing counters, and predetermining counters for automatic batch control, are available. More than one counter can be supplied for remote installation.

(MPT-53 flow integrator is product of Brooks Rotameter Company, Box 432, Lansdale, Pennsylvania.)

Check 2892 opposite last page.

Flow rate every 3 sec on 6-digit counter

Uses: Automatic batching applications.

Features: Flow rate is totalized every three seconds on six-digit counter.

NEXT MONTH

At Celanese, infrared spectrophotometry proves to be key to time savings and accuracy increase in analysis of plasticizer and additive contents of plastic products. Inside story of this development appears in this section next month.

EXTRA



CUSTOM ENGINEERED

RECTIFICATION

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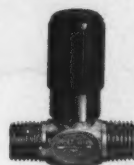
JULY 1959

Industry's big **DEMAND** for small valves keeps growing every day. A few years ago, Hoke's old plant  was more than adequate... the product line was limited to a handful of styles.  But along came nuclear energy and mass spectrometry and automation. So our lines grew and grew. 

HOKE now manufactures:



Bar Stock Valves to handle high pressures



Packless Valves to resist corrosion, hold high vacuum



Metering Valves to throttle down to a trickle




Check Valves to control one-way flow



Toggle Valves to flip on-off quickly



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Plus many other types, too. And we're not only making more, we're making them faster...with every Hoke Valve leak tested...in our new automated plant. 

When you need **QUALITY** small valves, delivered promptly, tell us your requirements.  We'll gladly send you our catalog  with specific recommendations. See our Catalog in Sweet's Product Designer's File

Hoke Incorporated,
45 Piermont Rd., Cresskill, N.J.



Check 2894 opposite last page

... another exclusive development
from FALLS  INDUSTRIES
... the almost perfect heat exchanger



Impervite

IMPERVIOUS GRAPHITE

CROSS-BORE HEAT EXCHANGER

... unaffected by all corrosives except a few highly oxidizing agents ... strongest, shock resistant construction available in any impervious graphite exchanger ... 20% higher overall heat transfer coefficient than tube and shell design ... provides new ease for thorough cleaning of shell side as well as tube side holes ... immune to thermal shock ... results in longer service life ... accommodates pressures in the 150-200 psi range at temperatures to 340°F ... overall dimensions same as tube and shell design ... available in capacities to 470 sq. ft. heat transfer surface.

Write today for quotation on your heat transfer requirements ... start enjoying the profits and efficiency of maintenance-free, corrosion-proof heat transfer equipment.

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AURORA ROAD • SOLON, OHIO

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The CROSS-BORE exchanger is composed of only three parts: (1) "one-piece" heat transfer cylinder, drilled longitudinally and laterally to permit passage of the two fluids or gases, (2) shell, and (3) domes. CROSS-BORE exchangers have been proving their unique value in held service for over 4 years.

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HPI REFRIGERATORS and TOWERS including all standard types of towers as well as special design HPI distillers. Bull. 505.

CROSS-BORE REFRIGERATORS accommodate pressures to 200 psi at temperatures to 400°F. Bull. 660.

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CENTRIFUGAL PUMPS Bull. 854-1.

FALLS INDUSTRIES, INC.
31909 Aurora Rd., Solon, Ohio

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| <input type="checkbox"/> Bulletin No. 182 | |

NAME

TITLE

COMPANY

ADDRESS

CITY ZONE STATE

Resilient Insulation Resists Vibration

Four-inch thick layers of flexible mineral wool blankets are attached to shell of vessels. Aluminized steel jacket and mastic weather sealing compound provide protection from weather

Problem: Insulation for four coke drums to be installed at Socony Mobil Oil Co., Paulsboro, N. J., had to be able to withstand vibration set up by drilling and high-pressure sluicing operations without fracturing or settling. Decoking is performed by a 93'-long drill pipe and high-velocity jets of water at 700 gpm and 1900 psi.

Coking unit is one of four new sections of a modernization program being undertaken at the Paulsboro refinery. Other sections are va-

por recovery, hydrogen sulfide, and acid treating. Primary product of the new installation will be light gas oil. By-products, in addition to coke, include dry gas, hydrogen sulfide, butane-butylene, 180°F and 380°F gasoline, and heavy gas oil.

Solution: Resilient, flexible mineral wool blankets were selected as the insulation medium. As further protection against damage from vibration, it was specified that the blankets be positively attached to shell rather than merely banded around it.

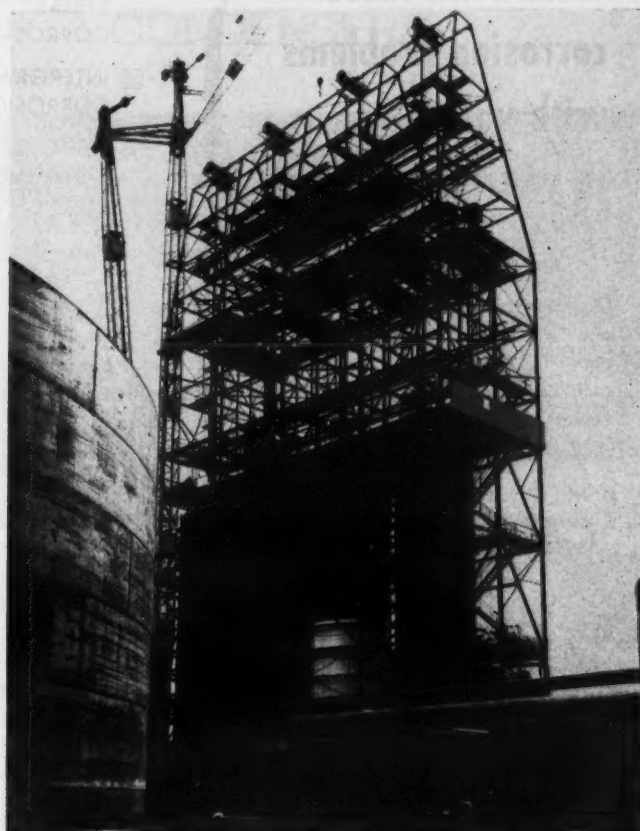
Four-inch thick blankets of mineral wool are impaled on welding pins and held against drum surface with self-locking speed clips



Good to 1200°F the spun mineral wool blankets can withstand the 800-900°F maximum shell temperature of coke drums. Their 4" thickness will reduce heat transmission so that the outside surface temperature of insulated vessels will be well below the 150°F maximum specified for personnel safety. A corrugated sheet metal jacket of aluminized steel was installed over insulation.

Installation

Photographs show how insulation was applied at Paulsboro. Insulation support rings circle the 19'-diameter vessels at intervals of about 12' along their 63' height. First of two



Insulation being installed on four new coke drums at Socony Mobil. Second drum from right is insulated and is receiving its aluminized steel raincoat. Superstructure will handle equipment required for decoking

rings of insulation covering the vessel between each support ring consists of 2 x 8' blankets hung longitudinally from the top ring by stainless steel tie wires. These wires were looped through the holes drilled in the ring and laced through the expanded metal lath outer facing of insulating blankets.

In addition, each blanket was impaled on 4½" welding pins previously welded to vessel surface. Self-locking speed washers slipped over the pins hold blankets snugly

How frequently are you faced with these ... corrosion problems with valves in your operation?

- ☒ CREVICE CORROSION
- ☒ PITTING CORROSION
- ☒ STRESS CORROSION
- ☒ INTERGRANULAR CORROSION
- ☒ UNIFORM CORROSION

Common problems...? Exceptional problem...? Which is it in your operation? Regardless of its nature, either common or uncommon, PACIFIC can help you bodyguard your operation against such corrosive elements with the proper selection of materials in valves of sound engineering principle and design.

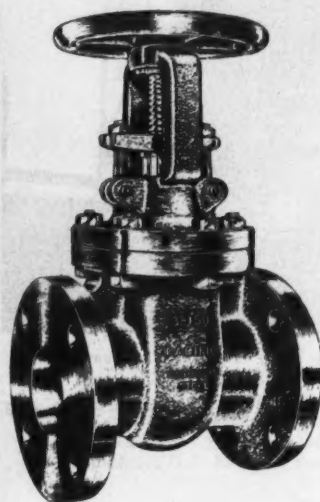


Figure Number 8550

Take for instance PACIFIC'S popular Figure Number 8550. Proper selection of material lends to its uninterrupted trouble-free performance. Lightweight pattern reflects sound engineering principle, providing maximum valve efficiency at a low initial cost! Heavy double discs, ball and socket design, ensure seat tightness and reduces hazard of galling. Tight fitting gasket joints prevent crevice corrosion on bonnet flange faces. Liberal internal areas reduce turbulence erosion of the body sections. You will find many uses for PACIFIC'S complete line of corrosion resistant valves in your operation... in steam, water, oil, gas, air, and numerous other types of corrosive services. For each application there is an economical solution... For each application there is a PACIFIC valve to do the job more efficiently-longer.

Write for corrosion resistant valves brochure.

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PACIFIC FORGE, INC. - Fontana, California
PACIFIC PATTERNS, INC. - Paramount, California

Sales offices in most principle cities.

Check 2896 opposite last page

PETROCHEMICALS

to vessel shell. Protruding ends of the pins were bent back into insulation so that they would not interfere with the application of aluminized steel weather proofing. Finally, adjacent edges of blankets were laced securely together with stainless steel wire. Lower 4' of shell surface and domed roofs were insulated in a similar manner.

Weatherproofing

Insulation on each of the four huge drums is protected from rain and moisture by a jacket made up of sheets of 26-gage corrugated Type 2 aluminized steel. Metal sheets were banded on 21" centers



Sheets of corrugated aluminized steel will protect insulation from the weather. Workman is drilling hole for sheet metal screw which joins adjacent sheets. Spring-loaded rope holds sheets in place until permanent stainless steel bands are applied

with stainless steel bands secured with double seals. Two bands were placed as near as possible to each circumferential seam.

Sheets were lapped two corrugations at longitudinal joints and each circumferential row of sheets laps 6" over row below. Adjacent corrugated sheets are joined at each seam with sheet metal screws on 6" centers and Z clips hung from the top each support ring. Domed heads were capped with aluminized steel in a similar manner.

All openings for fittings were weather proofed with H. I. Mastic Sealing Compound, 90-07. This asphaltic material keeps moisture from damaging metal surface. It also permits moisture vapors to escape from hot surface.

Results: It is expected that the resilient, flexible blankets fastened to the shell will withstand the vibration satisfactorily. Blankets were economical to install. Use of the aluminized steel jackets and mastic for weatherproofing protects insulation and steel while presenting an attractive appearance.

(Mineral wool insulation is product of Baldwin-Hill Co., 401 Breunig Ave., Trenton 2, New Jersey.)

Check 2897 opposite last page.

(Type 2 aluminized steel is manufactured by Armco Steel Corp., 955 Curtis St., Middletown, Ohio.)

Check 2898 opposite last page.

(H.I. Mastic Sealing Compound, 90-07 is product of Benjamin Foster Co., Div. of Amchem Products, Inc., 4635 W. Girard Ave., Philadelphia 31, Pennsylvania.)

Check 2899 opposite last page.

(Design, engineering, and construction of new facilities was done by The Lummus Co., 385 Madison Ave., New York 17, N.Y.)

Check 2900 opposite last page.

Chassis is removable in level control

Uses: Automatic performance of single functions, such as starting or stopping of pump, and opening or closing of solenoid valve. Also, for sounding alarm, and returning to standby condition.

Features: Controls have easily removable chassis for servicing of electrical components.

Description: Liquid-level controls are available for pressure ranges of 0.02 to 100 psi and to 30" vacuum. They are actuated by pressure element connected through tube transmission line to pick-up device located in tank at desired level.

(Series 1800 level controls are product of Petrometer Corporation, 43-22 10th St., Long Island City, N.Y.)

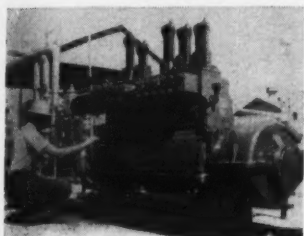
Check 2901 opposite last page.

**LP gas at 3000 psi
continuously pumped
at 52 gpm**

Problem: The plan of Burrell-North Pettus cycling plant called for pumps which could handle 52 gpm of liquid LP gas at 3000 psi 24 hr/day, 7 days week.

Solution: Quintuplex single-acting pumps were installed. Pumps are driven by 125-hp electric motors and are 1½ x 5" size.

Packing technique, developed for this application, utilizes five rings of V-type packing below and three rings above lantern ring. Plunger lubrication is mildly



Only routine maintenance has been necessary during eight years of continuous operation pumping 52 gpm of liquid LP gas at 3000 psi, with quintuplex single-acting pumps

compounded cylinder oil which is pumped directly into lantern ring.

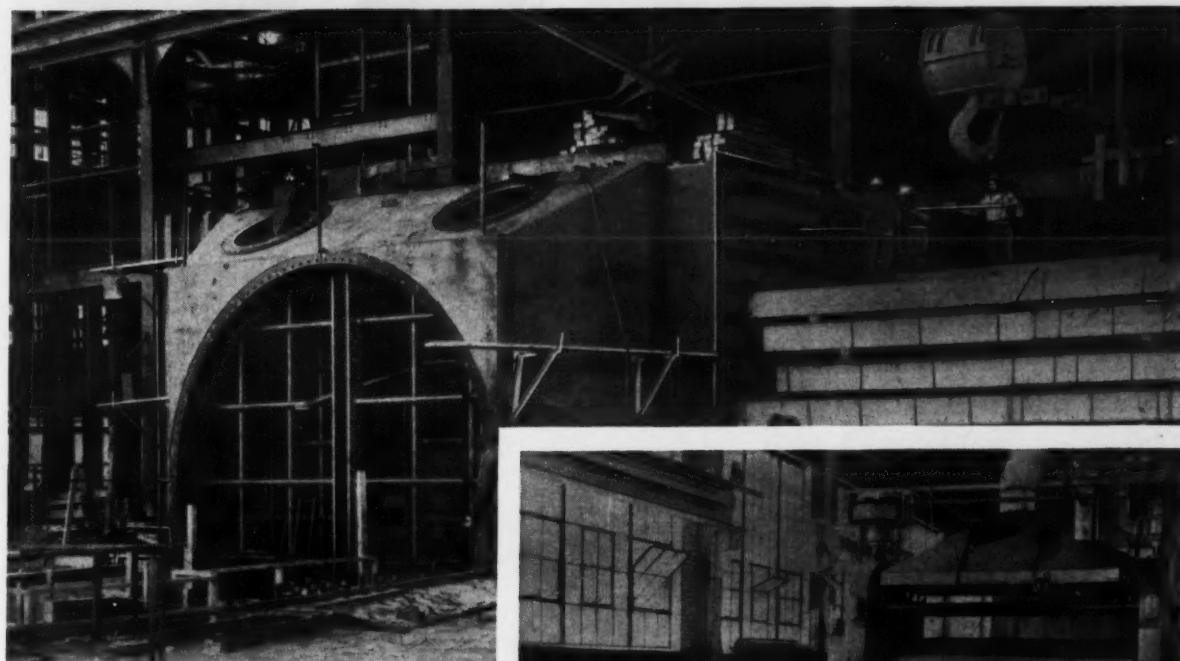
Results: Pumps were originally started against open-end line discharging to pit. Discharge pressure was then gradually raised. This method was found to be unsatisfactory with LP gas because increased throttling of liquid through pump froze packing. Loading pump as quickly as possible has overcome this difficulty.

Only routine maintenance has been needed during eight years of service.

There have been no breakdowns and packing life is exceptionally good. Service was made more severe by outdoor location exposing pumps to adverse weather conditions.

(Quintuplex single-acting pumps are product of Aldrich Pump Company, Allentown, Pennsylvania.)

Check 2902 opposite last page.



TOP: View of the new Clinch River Plant of Appalachian Power Co., at Carbo, Va. **ABOVE:** Tubing one of the two huge Allis-Chalmers surface condensers. The 26' x 15' openings in the shell use two Anaconda Leaded Muniz Metal-274 plates, each 156" x 189" x 1½" and weighing 13,700 lb. American Brass furnished the eight plates required, as well as the Arsenal Admiralty-439 tubes for the unit above — 19,100 lengths, ¾" x .049" x 30'. **RIGHT:** The big rolling mill at American Brass Company's Detroit Division which produced the plates.

THE unusually large plates required for the tube sheets at Clinch River Plant are standard items of The American Brass Company, which produces plates of copper and a number of copper alloys in rectangular sizes up to 156 inches in width and 15,000 pounds in weight. The maximum standard limits for circles are 160 inches in diameter and 11,000 pounds in weight. Half circles can be produced up to 13,000 pounds in weight.

ROLLED PLATES SUPERIOR. Anaconda rolled plates are commercially flat, accurate in dimensions, and free from surface imperfections and porosity often prevalent in cast plates.

SPECIAL JOBS. Whenever you have a problem involving

extremely large plates in standard or special copper alloys, The American Brass Company will gladly assist in its solution. For general information on Anaconda Condenser Tubes and Plates write for Anaconda Publication B-2: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA®
Tubes and Plates for
Condensers and Heat Exchangers
MADE BY THE AMERICAN BRASS COMPANY

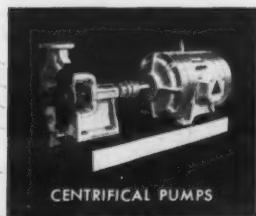
Check 2903 opposite last page

INDUSTRIAL

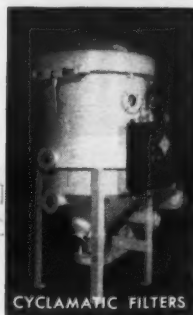
ENGINEERED EQUIPMENT for liquid Clarification · Recovery · Treatment



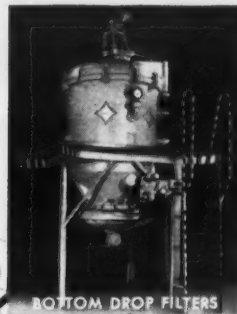
RESINOUS SOFTENERS



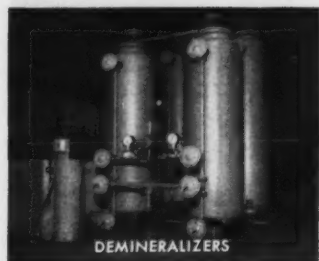
CENTRIFUGAL PUMPS



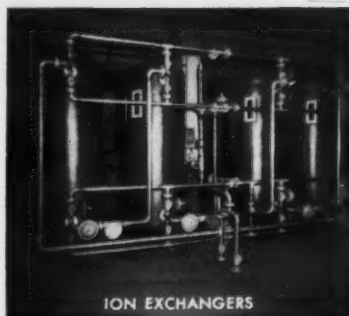
CYCLAMATIC FILTERS



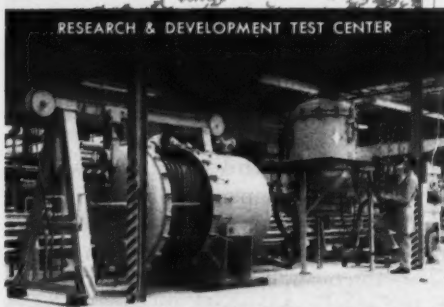
BOTTOM DROP FILTERS



DEMINERALIZERS

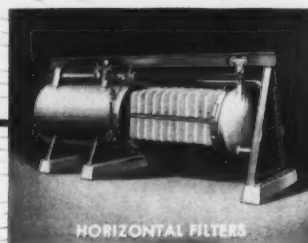


ION EXCHANGERS

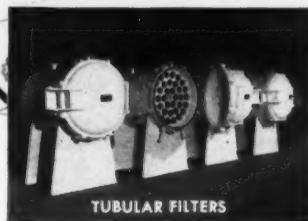


RESEARCH & DEVELOPMENT TEST CENTER

INDUSTRIAL FILTER
& PUMP MFG. CO.



HORIZONTAL FILTERS



TUBULAR FILTERS

COMPATABILITY of the filtering equipment with the filtering job is the reason why operators rely on *Industrial* for low-cost destruction of toxic waste, or for clarification, recovery or treatment within the system.

Why not investigate *Industrial's Engineering Survey Service?* . . . for a thorough appraisal of your needs by qualified chemists and engineers. Write for details and . . .

See our advertisement PP1263—1268 in the 1958-59
Chemical Engineering Catalog.

INDUSTRIAL

INDUSTRIAL FILTER & PUMP MFG. CO.
5908 Ogden Ave., Cicero 50, ILLINOIS

Check 2904 opposite last page

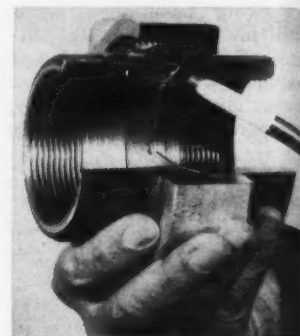
PETROCHEMICALS

Beveled orifice union serves double duty

Uses: Joining sections of pipe and measuring or controlling flow of liquids and gases under pressure.

Features: Unit is equipped with one-piece stainless-steel disc shaped to fit contour of seats. This eliminates need for gaskets.

Description: Beveled orifice union is easy to install on



Beveled orifice union is designed to join pipe sections and/or measure and control flow of liquid and gases under pressure

both horizontal and vertical lines. It is equipped with steel tab which indicates size of orifice opening. Made of carbon steel, unions are available in all sizes from 1/4 to 2" pipe sizes.

(Beveled orifice unions are product of Clayton Mark & Company, 1900 Dempster St., Evanston, Ill.)

Check 2905 opposite last page.

Pressure vessels, vessel fabrication facilities, and field erection of pressure vessels, towers, tanks, and similar items, are pictured in four-page Buls 10-A, 10-B, and 10-C—Solar Chicago, Division of U. S. Industries, Inc., 6400 W. 66th St., Chicago 38, Ill.

Check 2906 opposite last page.

Chromatography is subject of 52-page catalog. More than 134 instruments and accessories available for gas and vapor chromatography are described. In addition, 158 different listings of partitioning agents are given. Cat 84 — Burrell Corporation, 2223 Fifth Ave., Pittsburgh 19, Pa.

Check 2907 opposite last page.

THAT'S INTERESTING

Job market

University of Michigan reports number of job offers to its engineering students has gone up and may go higher. Sampling of offers indicates salaries are up about 5% with a bachelor's degree graduate at about \$505 per month; Master's at about \$600, and a PhD at around \$780.

Water costs

Good water that is commercially produced from brackish salt water costs more than \$1 per thousand gal in the Middle East.

The same amount of low-salt irrigation water costs less than a nickel in most parts of the U.S.

Plutonium trap

Researchers at Argonne National Laboratory have discovered two chelating agents which trap plutonium for easy elimination from animals. *The Rotarian Magazine* reports the compounds may prove valuable in treating humans who have been poisoned with plutonium.



"Stainless Steel reduces material and replacement costs"

reports Mr. William R. Boyles, Plant Manager, Stauffer Chemical Company, Monongahela, Pa.

The Stauffer Chemical Company of New York City is a major producer of industrial and agricultural chemicals. Many of its 52 plants around the country make or process highly corrosive chemical solutions. In the past, equipment at the Chauncey and Monongahela plants had to be replaced about every two years because of corrosion—particularly at pipe joints and threadings. This meant a plant shutdown or a cut in production to make the necessary repairs.

In 1954, after experimenting with other materials, the company decided Stainless Steel was the most suitable metal. It was then used to replace vital parts in equipment. Here are the results at Stauffer's Monongahela plant according to Plant Manager, William R. Boyles: "Stainless Steel has definitely solved most of our problems of equipment replacement. We no longer suffer periodical shutdowns or delays in production because of corroded equipment. Stainless Steel has proven its effectiveness against corrosion. It has saved us time and money. We have had our Stainless Steel equipment in continuous use

since the day it was installed—and it's still in excellent condition. In fact, we expect it to last for 15 years—maybe longer."

End corrosion losses in your plant. Build and repair with Stainless Steel. USS Stainless Steel is available through your U. S. Steel representative or your local Steel Service Center.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel



PETROCHEMICALS

Gas-engine compressors aid helium recovery

The fifth unit in the Bureau of Mines' series of helium-recovery plants, to be constructed at Keyes, Oklahoma, will incorporate six large gas-engine compressors.

Compressors will compress natural gas containing helium



Helium recovery installation of Bureau of Mines at Keyes, Oklahoma, will be aided by six gas-engine compressors

to extremely high pressures in order to separate helium from remainder of natural gas.

(GMW gas-engine compressor is product of Cooper-Bessemer Corporation, Mt. Vernon, Ohio.)

Check 2908 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Molecular sieves are key to normal-paraffin separation

Process may be stimulant to petrochemical use

Recently developed continuous process for separation of normal paraffins from hydrocarbon mixtures, utilizing molecular sieves is expected to stimulate petrochemical manufacture and open up new paraffin uses.

Process is intended to improve motor-fuel quality by removal of low-octane straight-chain paraffins from high-octane blanched isopar-

In Masoneilan Transmitters...



Transmitter No. 1105
Pressure Transmitter
with remote control, showing
control, signal, and power

Important Design Features Give You Top Performance

Accurate, dependable pneumatic transmission of pressure or temperature is assured by these compact, lightweight, force-balance transmitters. In addition to the advantages inherent in this class of instruments, the Masoneilan design offers a number of features which make them outstanding.

- 1 **Balanced beam permits mounting in any position without zero shift; permits changing position at will without rezeroing.**
- 2 **High accuracy — for example a 100F span temperature transmitter set for 0-100F is accurate within $\pm 0.5^\circ$.**
- 3 **Locked span-location setting is unaffected by vibration — will not shift.**
- 4 **High capacity, balanced relay speeds transmission; permits longer transmission lines.**
- 5 **Derivative unit and integral receiver gauge may be added without tubing and without removing cover.**
- 6 **Unit subassembly construction permits changeover from temperature to pressure (or vice versa), or change of span, without disturbing beam.**

Simplicity and unit construction, plus compact ruggedness, make these transmitters very easy to install and maintain. This, plus moderate first cost, makes them a topnotch investment in improved measurement and control. Send for your copy of bulletin.

MASON-NEILAN

A Division of Worthington Corporation

25 NAWATAN STREET, NORWOOD, MASSACHUSETTS

District offices or Distributors in principal cities in U.S.

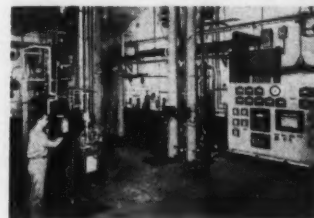
In Canada: Mason-Neilan, Division of Worthington (Canada), Ltd.

MN9-9

Check 2909 opposite last page

affins and cyclics. Normal paraffins can then be isomerized for fuel use or converted to intermediate chemicals.

Process is reported to consume less utilities than fractionation in any separation of normal paraffins from other



New process for separation of normal paraffins from hydrocarbon mixtures has proved worth in pilot-plant operations

hydrocarbons. This economical separation is expected to stimulate manufacture of other petrochemicals.

Abundant supplies of high-purity normal paraffins could be basis of synthesis of aldehydes, alcohols, and other straight-chain organic chemicals. Normal paraffins might also be preferred stock for high intermediates, since paraffins are easily cracked.

(Molex process is development of Universal Oil Products Company, 30 Algonquin Road, Des Plaines, Ill.)

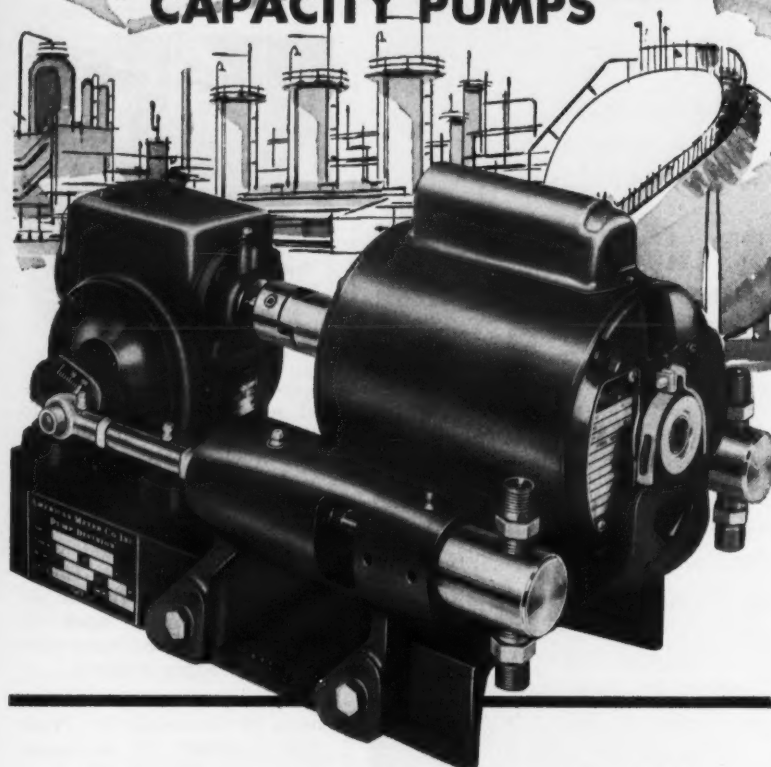
Check 2910 opposite last page.



"This is the only plant in the country that practices reincarnation. . . everyone comes to life at 5 o'clock!"

NEW

AMERICAN CONTROLLED CAPACITY PUMPS



JOB ENGINEERED FOR LONG-TERM ACCURACY AND LOWEST MAINTENANCE COSTS

New American controlled capacity pumps are precision built to meet the needs of Chemical Processing, Refining and Boiler Feed applications. Quality construction assures highest accuracy in feeding precisely metered fluids or slurries into low or high pressure systems in virtually all desired ratios, with flow, temperature, pressure, conductivity, PH and other controlled process variables. Control may be manual or automatic—with electric, hydraulic or pneumatic systems.

Newly designed models are available to handle a wide variety of "tough," corrosive and viscous materials.

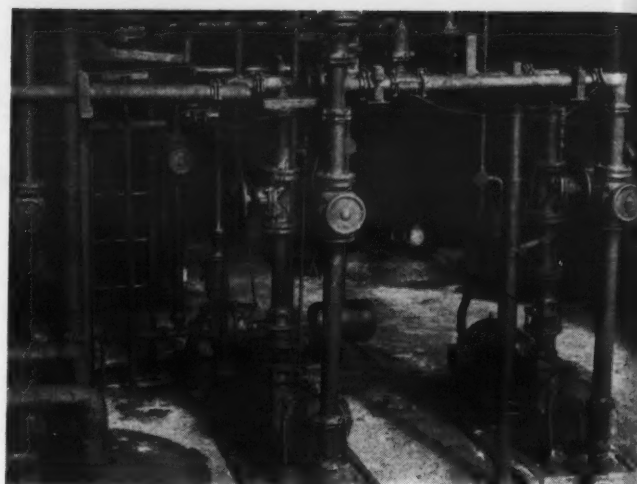
Write today for full information on American's new controlled capacity pumps. They're sure to meet your fluid proportioning requirements.

AMERICAN[®]
METER COMPANY
INCORPORATED (ESTABLISHED 1936)
pump division

13300 PHILMONT AVE., PHILADELPHIA 16, PENN.

Check 2911 opposite last page

PETROCHEMICALS



Diaphragm valves handle benzene hexachloride without leakage

- Furnish four years service instead of one to two months given by former valves, cutting replacement costs and downtime

Problem: Slight leakage around valve stems caused a dangerous and expensive problem in the manufacture of benzene hexachloride at Diamond Alkali's Greens Bayou, Texas, plant. Leakage released toxic fumes and caused rapid corrosion of valve's metal parts as well as adjacent equipment.

Valves are required to give both shutoff and throttling action, handling a product containing 30 to 40% benzene and free chlorine. High cost and frequency of replacement of whole valves demanded more efficient valving.

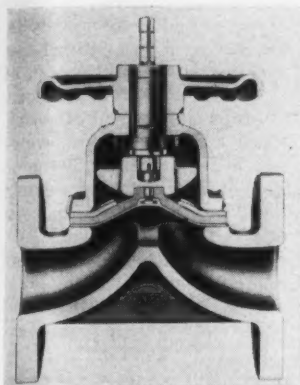
Solution: Five years ago the troublesome valves were replaced by diaphragm valves which require no stem packing because the diaphragm seals the product in line, pre-

vents contact with the operating mechanism. The diaphragms are made of Teflon which is unaffected by the products handled.

A patented backing cushion of molded synthetic rubber supplies resilience, provides additional support, and assures positive shutoff. When, after an average of two years of service, the diaphragms require replacement, this is easily accomplished without removing the valve body from the line.

Results: First replacement of any part of the valves has been stretched out to two years (for replacement of the diaphragms only; in place of one to two months for the complete valves previously used). Leakage of both the fluid and the fumes has been

Some of the valves in service at Diamond Alkali's Greens Bayou, Texas, plant employed in handling benzene hexachloride



Cutaway view of valve with Teflon diaphragm in open position

ended. Over a five-year period the average life of the new valve bodies, with glass linings, has proved to be four years.

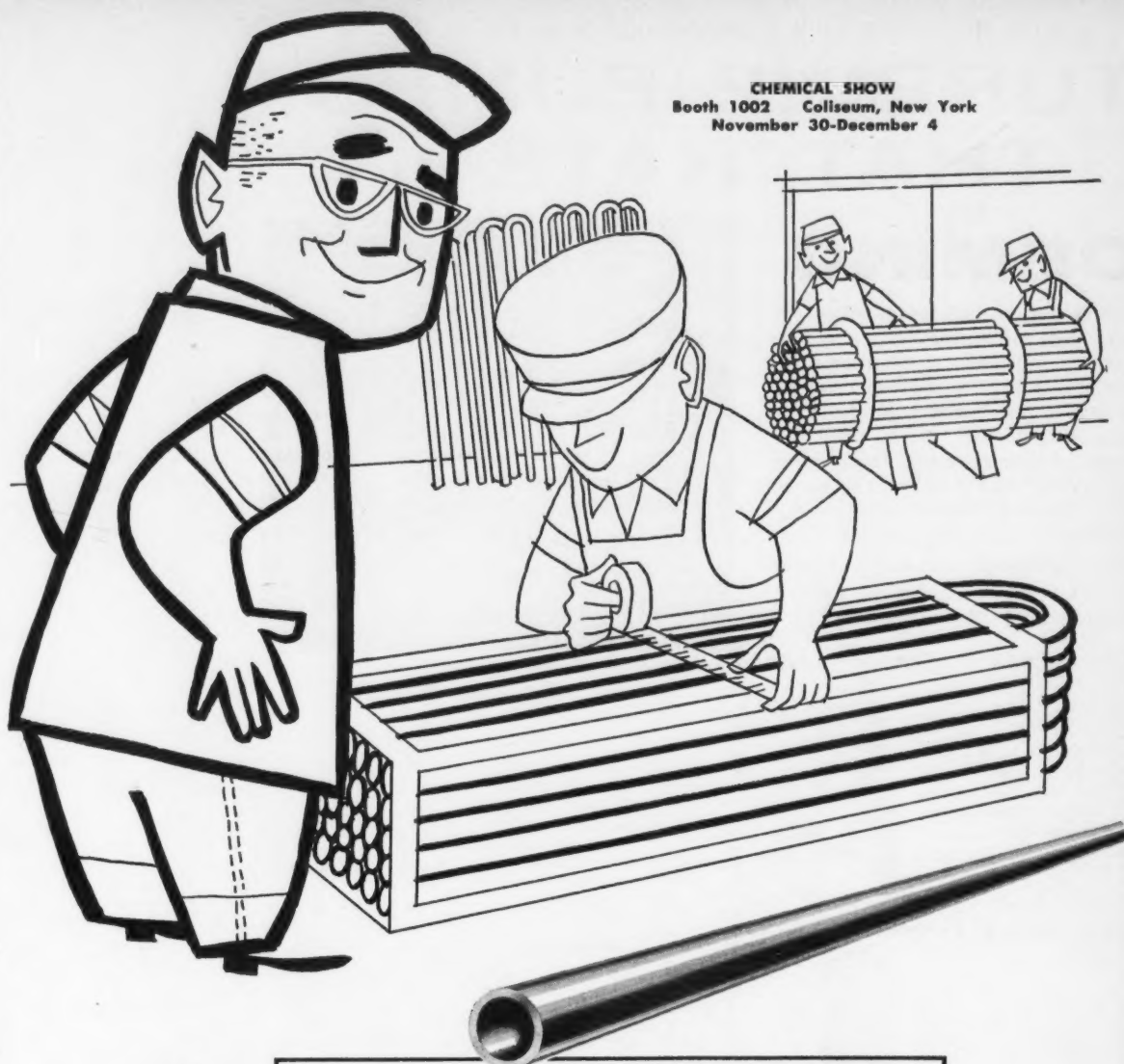
Using these less expensive diaphragm valves, of which 34 are required in the benzene hexachloride operation alone and several hundred others throughout the plant, replacement costs have been greatly reduced. Downtime required for the replacement of valves which failed has been practically eliminated, resulting in increased production.

(Diaphragm valves used at Diamond Alkali are Grinnell-Saunders valves made by Grinnell Company, 260 West Exchange St., Providence 1, Rhode Island.)

Check 2912 opposite last page.

Synthetic ammonia plant on stream in Peru

Peru's first synthetic ammonia plant went on stream in Callao in April. Plant will utilize a Fauser-Montecatini process to produce ammonium sulfate and ammonium nitrate fertilizers, anhydrous ammonia, nitric acid, and ammonium nitrate.



How B&W JOB-MATCHED TUBES

provide long service life in stainless steel

When you specify B&W Stainless Heat-Exchanger Tubes—either seamless or welded—you can count on:

- ... a complete range of stainless grades to meet any set of service conditions
- ... a wide variety of diameter and wall thickness combinations for all types of operating requirements

... fully annealed tubes for maximum resistance to corrosion

These are just a few of the reasons it pays to specify B&W Job-Matched Stainless Steel Heat-Exchanger Tubes. Call your local B&W District Sales Specialist, or write for Bulletin TB-329 for full information. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.



TA-9019-53

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

Check 2913 opposite last page

FOR PUMPING OILS, CHEMICALS, SOLVENTS, ETC.

TURBINE PUMPS THAT "RATE"

by
DEMING

Deming close-coupled Turbine Pumps are engineered and recommended for specific industrial applications at the highest performance ratings. The functional reliability of Deming close-coupled Turbine pumps is basic. It comes from years of "know-how" in design and manufacture. The "performance rating" chart illustrated is but one of many indicating Deming top performance under critical operating conditions.

Specify a Deming close-coupled Turbine Pump with confidence. They are available in a broad range of sizes and drives.

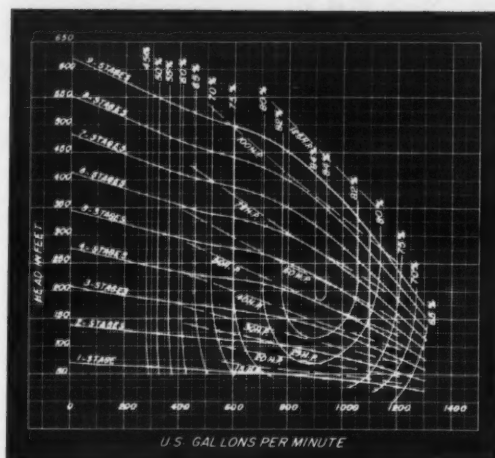


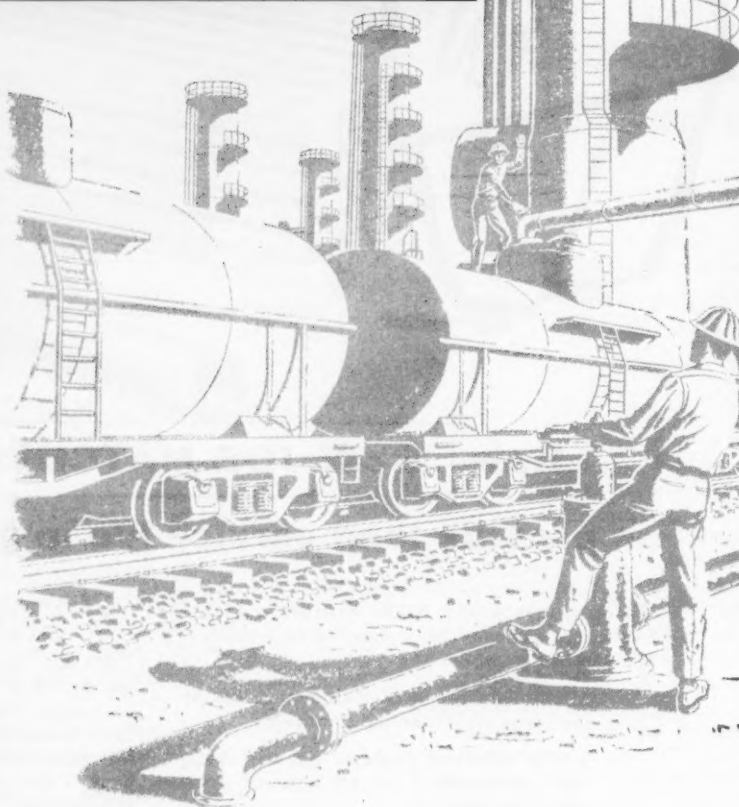
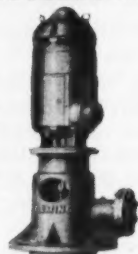
Figure 4700: Available with bowl sizes from 4 to 16 inches in a complete range of sizes with any type power.



Figure 4703: Designed especially for pumping gasoline and oil from underground tanks. Capacities from 15 to 75 G.P.M. for pressures up to 100 lbs.



Figure 4700-G: For fueling systems and testing station service these pumps are usually mounted directly on steel or lined concrete storage tanks below ground. Complete range of sizes.



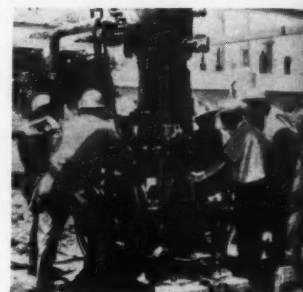
PETROCHEMICALS

**Powered by natural gas,
steam-type engine
pumps 500 gpm**

Unit that develops 60 hp
is in 24 hr/day service

A 60-hp engine utilizing normal steam-engine cycle, but powered by natural gas transmission-line flow, is in 24 hr/day operation at La Gloria Oil and Gas Co. in Falfurrias, Texas. Engine displaces water from a deep well at 500 gpm. Hence, energy that would otherwise be wasted is converted into useful work.

Engine is used as reducing valve between higher pressure of gas-dehydrator discharge line and lower pres-



Engine operates on normal steam-engine cycle

sure feed to a transmission pipeline. This provides desired differential pressure or cascading action to furnish power.

Gas flows into inlet at 50 to 1500 psig and from outlet at 0 to 900 psig. Size range of engines is 10 to 400 hp.

(Natural-gas steam-engine is product of Troy Engine & Machine Co., 35 Parsons St., Troy, Pa.)

Check 2915 opposite last page.

Diaphragm valves with glass-lined ductile iron bodies are illustrated and discussed in two-page bulletin. Data sheet D1 — Grinnell Company, Inc., 277 West Exchange Street, Providence 1, R. I.

Check 2916 opposite last page.

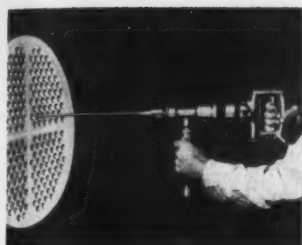
Temperature regulators are cataloged in 12-page bulletin, including diagrams and specifications. Bul 114A—Manning, Maxwell & Moore, Incorporated, Stratford, Conn.

Check 2917 opposite last page.

Ask for a recommendation on your next project

The DEMING Co.
707 BROADWAY • SALEM, OHIO

Check 2914 opposite last page



Heat exchanger cleaner

... is capable of cleaning severely clogged tubes up to one inch in diameter. Cleaner weighs 10 lb. It can be operated without supporting rig.

Single-stage geared air-driven motor operates at 3800 rpm. Air-flushing system keeps drill head cool and removes cuttings. Flushing system is controlled by stainless steel sleeve valve.

(CC-475 condenser cleaner is product of Airetool Manufacturing Company, 328 S. Center St., Springfield, Ohio.)

Check 2918 opposite last page.

**Integral finned tube
upped in area**

Surface area of Type S/T integral finned tube has been increased by 13%. Increase is expected to result in savings in tube necessary for shell and tube heat exchangers.

(Admiralty Type S/T Trufin is product of Wolverine Tube, Division of Calumet & Hecla, Inc., 17200 Southfield Rd., Allen Park, Mich.)

Check 2919 opposite last page.

Heat exchangers, engineering fabrications of both plate and structural types and packless expansion joints are reported in 16-page Bul YCP858—Yuba Consolidated Industries, Inc., 351 California St., San Francisco 4, Calif.

Check 2920 opposite last page.

Production of tetraline (tetrahydronaphthalene) oxidation products, tetralone, α naphthol, and tetracetic acid, is thoroughly discussed in 26-page Tetraline Booklet—French Oil Industry Agency, 610 Fifth Ave., Room 408, New York 20, N.Y.

Check 2921 opposite last page.

This won't stop corrosion— but versatile-flexible **TYGON® WILL!**



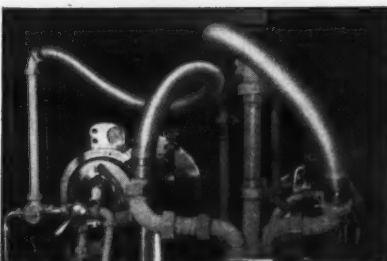
Simply crossing the fingers doesn't help much when it comes to corrosion control. But a sure-fire method—and much more economical in the long run—is to specify Tygon if corrosion is a problem in any product you make. Available in a variety of convenient forms and job-specified formulations, Tygon offers superior resistance to a wide range of acids, alkalis, salts, alcohols, oils and solvents.

CHECK THE WAYS TYGON CAN IMPROVE VALUE AND PERFORMANCE OF YOUR PRODUCT



AS A COATING

Easily applied by brush, spray, dip or roller-coat, Tygon forms a fast-cure, tough, impermeable plastic barrier that seals out corrosive fumes and acids. Gives equipment longer lasting protection against chemical attack and extreme moisture.



AS TUBING OR HOSE

Flexible, glass-clear Tygon Tubing is ideal for piping flavor-sensitive liquid foods or corrosive chemicals. Non-toxic, non-contaminating, sterilizable. Tough, durable, abrasion-resistant for long service life. Available 1/16" to 4" I.D.

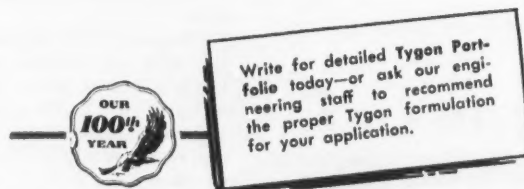
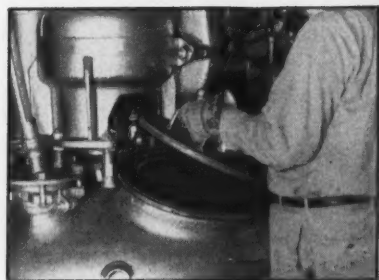
AS LININGS

Tygon Sheeting offers heavy-duty protection against corrosive solutions in storage and processing tanks of all shapes and sizes. Easier to install, handles many of the tough jobs rubber and other linings cannot do.



AS GASKETING

Tough, resilient Tygon Gasketing assures tight, durable, leak-proof sealing. Its excellent chemical resistance eliminates costly corrosion "trouble spots" where other materials fail. Cut from sheet, tubing, solid cord, or molded to your specifications.



445-F

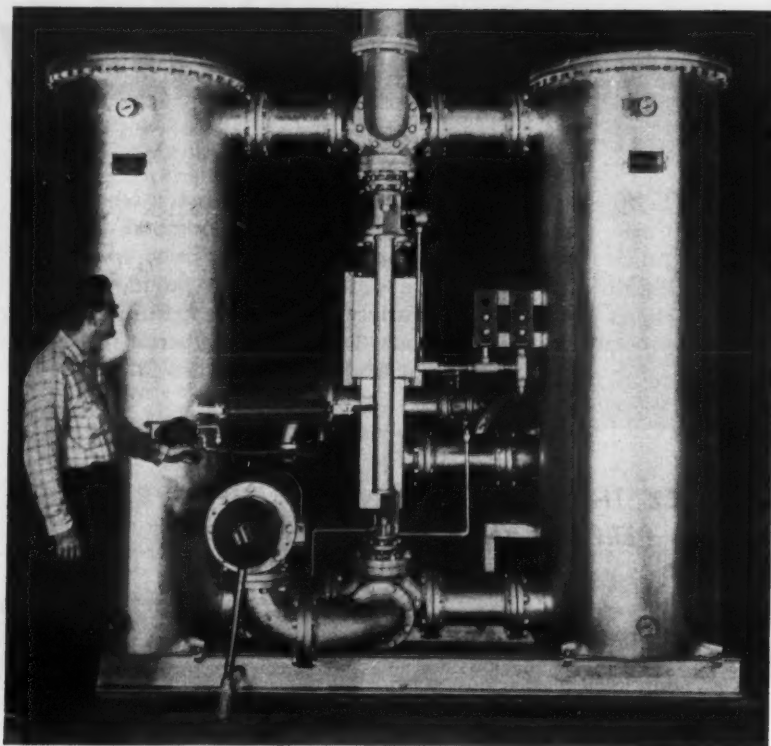
PLASTICS AND SYNTHETICS DIVISION



U. S. STONEWARE
AKRON 9, OHIO

Check 2922 opposite last page

Continuous, Automatic Drying of Compressed Air, Process Gases and Liquids with Selas Dehydrators



LOW PRESSURE DEHYDRATOR for continuous drying of furnace atmosphere and low pressure process gases. Closed-cycle reactivation is utilized, preventing contamination of the process gases with air or other diluents.

Selas offers a standard line of steam and electric reactivated Dehydrators . . . **internal** (with the heater imbedded in any commercial desiccant for low equipment cost) . . . **external** (where more positive reactivation heat control is desired). Selas Dehydrators are available in low pressure series and high pressure series to handle compressed gases.

In addition to the standard line, Selas custom-builds units for large volumes, special conditions, extreme pressures and unusually low dewpoints.

Send for descriptive Bulletin 147 illustrating complete line of Selas Dehydrators.

SELAS Heat and Fluid Processing Engineers
CORPORATION OF AMERICA
DREXEL, PENNSYLVANIA
DEVELOPMENT • DESIGN • CONSTRUCTION



Check 2923 opposite last page

PETROCHEMICALS

Draft for packaged boilers provided by blowers rated at 13,000 cfm

Units serve in power plant of asphalt refinery

Draft for two packaged outdoor-type boilers is provided by a pair of 13,000-cfm-capacity turbine blowers, for power plant of recently completed asphalt refinery of Cities Service Oil Company at Linden, New Jersey.

Plant is geared to produce 400,000 tons of paving and in-



Compact blowers may be mounted directly on boiler, permitting shipment as complete unit

dustrial asphalts annually. Output can be expanded to 500,000 tons annually with minimum added investment. Currently, 14,000 barrels of crude oil are processed daily.

Facilities include two-stage distillation unit, gasoline column for solvent production, treating facilities for solvents and gasoline, three vertical oxidizers, and asphalt blending, storage, and shipping facilities. New steam plant and circulating-hot-oil system for heating asphalts are principal auxiliary units.

Outdoor-type packaged boilers, utilized in power plant, each has continuous rating of 40,000 pounds of steam per hour at 150 psig. Boilers are equipped with automatic controls to adjust draft and firing rate in order to hold constant steam pressure.

Adequate draft for boilers is provided by turbine blowers. Blowers have max specified capacity of 13,000 cfm with sufficient reserve for operating at even higher ratings if necessary.

Blowers were designed to exhaust to 30-psig steam sys-

tem. Steam system, along with steam obtained by reducing from 150-lb mains, is fully utilized for secondary requirements. This steam is employed for heating crude and heavy fuel tanks and for boiler water deaerator.

Turbine drives are source of exhaust. They permit normal operation of boilers during periods of electrical power failure. Compact blowers may be mounted directly on boiler permitting shipment as complete unit.

(Outdoor-type packaged boilers are product of Foster Wheeler Corporation, 165 Broadway, New York, New York.)

Check 2924 opposite last page.

(24 AR-4D turbine blowers are product of L. J. Wing Mfg. Co., Linden, N.J.)

Check 2925 opposite last page.

Finned heat exchanger tube, in which the fins are integral with the tube, is discussed in detail in 24-page bulletin. A number of different types for both air cooling and water cooling are discussed in detail. Bul 17383 — Wolverine Tube, Div. of Calumet & Hecla, Inc., 17200 Southfield Road, Allen Park, Mich.

Check 2926 opposite last page.

Strip-chart recorders with full scale balancing time of one second, are described in eight-page brochure. Units are compact and light in weight. "Strip-Chart Recorders" — Varian Associates, 611 Hansen Way, Palo Alto, California.

Check 2927 opposite last page.

Pipe fittings and hangers suitable for petrochemical applications are discussed in literature. Three recently developed products are discussed. Of these Sweepolet is a forged, integrally reinforced, insert butt welding pipe fitting designed for applications on high-yield pipe. Brazolet is a bronze brazing outlet fitting for silver brazing to copper or brass pipe, or tubing. Hangolet is a welded pipe hanger attachment which eliminates stress.

"Sweepolet, Brazolet, and Hangolet" — Pennsylvania Div., Bonney Forge and Tool Works, Allentown, Pa.

Check 2928 opposite last page.

A-Waste Disposal

From page 23

feel the time has come to re-appraise the hazards in view of the greater knowledge of those hazards, and the desire to use radioactive material more widely.

In contrast, at the present time, our regulations permit the disposal of only minute amounts of radioactive wastes through uncontrolled carriers such as sewage, air, etc., in amounts not to exceed established limits. For example, it might be feasible that the practice of off-shore dumping in specified dumping grounds of radioactive wastes of perhaps one curie per year per disposer in any one dumping be subject only to the restrictions that the container be of a type that will certainly sink and that materials contained therein stay submerged until they are dissipated into the ocean.

Steamships

Ocean-going liners offer another plausible and less expensive way of disposing of containers housing radioactive wastes. Under the supervision of the AEC, the ships could take the containers, properly prepared in accordance with ICC regulations, and drop them into the sea in the course of their voyage.

The nuclear waste disposal problem facing us today is similar to the stream pollution problem that we faced 30 years ago. We worked our way out of that one and we shouldn't give up too easily on this one. The possibility of a radical discovery in the area of waste disposal technology shouldn't be discounted in this age of remarkable achievements.

A basic research program should be established to explore the fundamental laws of physics and chemistry if necessary, in order to find new methods for coping with the disposal problem. The ultimate aim of the program would be to free us from the present primitive techniques of encapsulation and waiting for the passage of time to do its work.

We should explore even the most imaginative solu-



Evaluating equipment for process application?

Be sure one of the sources you consider is American-Standard Industrial Division

HERE'S WHY: By combining the engineering backgrounds and product lines of three American-Standard* divisions — American Blower, Ross Heat Exchanger, and Kewanee Boiler — the new Industrial Division offers one-source responsibility for quality and performance in equipment that is designed, engineered, and manufactured to work together.

There are engineer-staffed offices in all principal cities to work with architects, consulting engineers, and contractors with equipment selection and on-the-job problems. Contact the one nearest you. American-Standard Industrial Division, Detroit 32, Michigan. In Canada: American-Standard Products (Canada) Limited, Toronto, Ontario.



Firebox, scotch-type steel boilers and package units for heat, power, steam.

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Check 2929 opposite last page

A-Waste Disposal

From preceding page

tions. Considering the vast scientific talents available to us today and the inevitable high future cost of continuing present safe disposal methods, we should take full advantage of this opportunity to re-examine the issue.

(Based on testimony of Mr. Auchincloss at recent public hearings on Industrial Radioactive Waste Disposal in Washington, D.C.)

CPI Profit Picture

From page 25

another source of pricing difficulty exists. The number of producers, notably those of ammonia and synthetic resins, has increased rapidly in recent years. Dissemination of technical know-how and the desire to integrate or diversify has encouraged new entrants.

This trend has tended to restrict the length of time a chemical company can expect to realize above-average profits from successful development of a new product or process. It also has compelled vertical integration in order to protect markets.

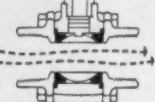

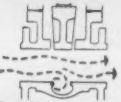

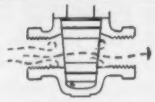
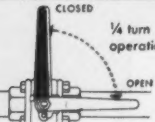


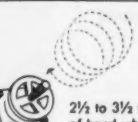
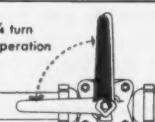

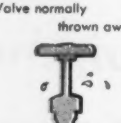

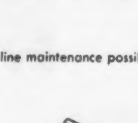
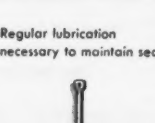



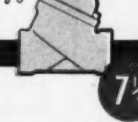

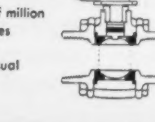
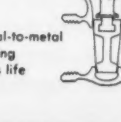
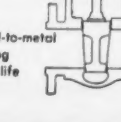
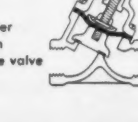
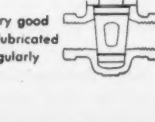
The desirability of gaining control over end products has been emphasized in recent years by the trend of earnings of companies supplying end markets as compared with companies supplying basic and intermediate chemicals. Only four of the 16 basic chemical producers in the portfolio of Chemical Fund reported higher earnings per share in 1958 than in 1955.

During the same period, six of the nine specialty chemical companies in the Fund showed increased earnings. A majority of the Fund's oil company holdings and all 16 drug companies showed earnings gains.

Conclusions

Over the last three years, earnings progress of chemical companies has been disap-

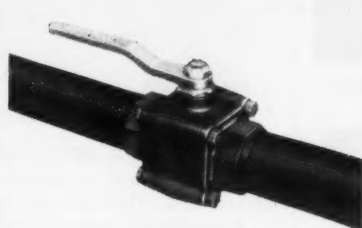
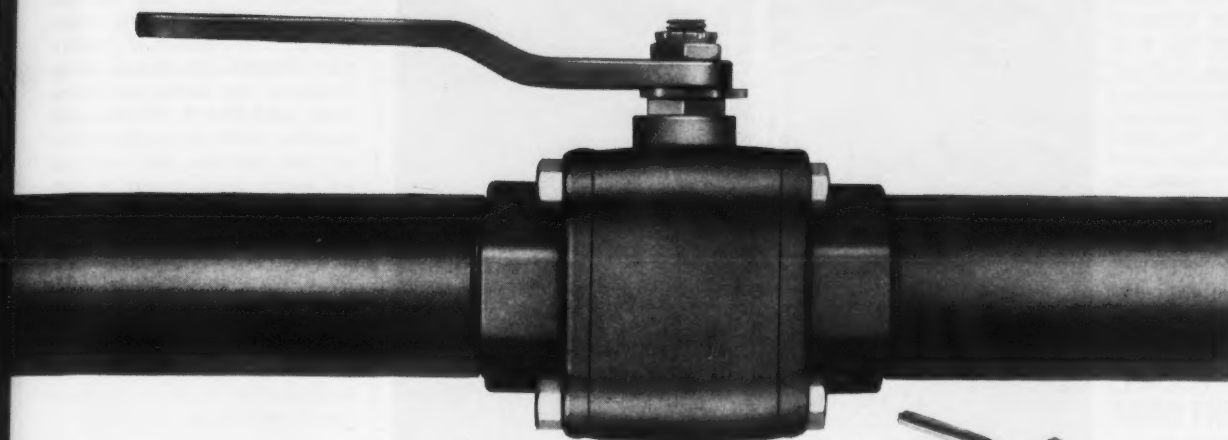
COMPARE...

ECON-O-MISER	GATE VALVE	FLANGED GATE VALVE	DIAPHRAGM VALVE	LUBRICATED PLUG VALVE
 Smooth round flow	 Turbulence results in excessive pressure drop	 Turbulence results in excessive pressure drop	 Turbulence results in unusually high pressure drop	 Constricted flow ... pressure drop
 CLOSED 1/4 turn operation OPEN	 2 1/2 to 3 1/2 turns of hand wheel	 2 1/2 to 7 turns of hand wheel	 2 1/2 to 3 1/2 turns of hand wheel	 1/4 turn operation
 Seats and "O" Rings easily replaced	 Valve normally thrown away	 30% to 50% of purchase price	 In-line maintenance possible	 Regular lubrication necessary to maintain seal
 CENTER TO TOP—OPEN 3 5/16"	 12 1/2"	 16 1/2"	 7 1/2"	 10 1/2"
 Half million cycles not unusual	 Metal-to-metal seating limits life	 Metal-to-metal seating limits life	 Better than gate valve	 Very good if lubricated regularly

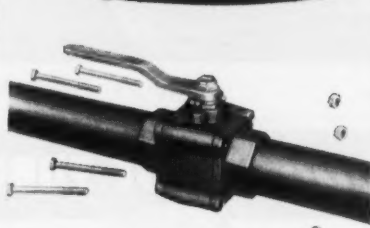
THE ECON-O-MISER BALL VALVE
IS THE IDEAL REPLACEMENT FOR MOST
ON-OFF VALVES NOW IN USE IN THE
PROCESS INDUSTRIES!

MORE EFFICIENT ... LESS COSTLY

THE ECON-O-MISER BALL VALVE



Compact, efficient ECON-O-MISER Ball Valves are today's smoothest operating on-off valves. A quarter turn of the handle allows full operation and you can tell at a glance whether the valve is open or closed. More... ECON-O-MISER Ball Valves act as both valve and union... eliminate costly inventory and labor. Minimum turbulence and greater economy make this valve ideal for hundreds of applications.



Remove four nuts... four bolts... and the entire center section lifts out for servicing. Quick, convenient maintenance saves money and this unique design means pipe ends never have to be removed from the line. Seating surfaces and O-Rings are easily replaced... whole valve back in operation in minutes. Reduces inventory expenses and frees maintenance personnel from time consuming repairs.



The ECON-O-MISER Ball Valve is available in many combinations of seats, O-Rings and body materials. Almost any media can be handled by the ECON-O-MISER and sizes range from 1/4" through 6". Made of bronze, aluminum, carbon steel, stainless steel or aluminum bronze. We'll be happy to furnish information or application data.

pointing. Poor earnings results have been encountered despite a fundamentally healthy sales trend. This paradox arises in part from overcapacity with resulting inefficiencies of capital utilization. It is also due in part to pricing practices which have become overly competitive in many areas.

Some relief to the conditions of overcapacity are beginning to be felt, and it is believed this trend will make it possible to restore more normal profit margins to the industry. During past periods when an excess of capacity began to be absorbed, profits have responded quickly. Up to the present time, this pattern is repeating itself.



"I'm not paying you to hold up that water bottle, Murphy!"



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Complete, technical information in new "Comparison" bulletin.

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WORCESTER VALVE CO., INC.
DEPT. C • 16 PARKER STREET • WORCESTER, MASS.

Check 2930 opposite last page

NOW! THROTTLEABLE GATE VALVE IN PLASTIC

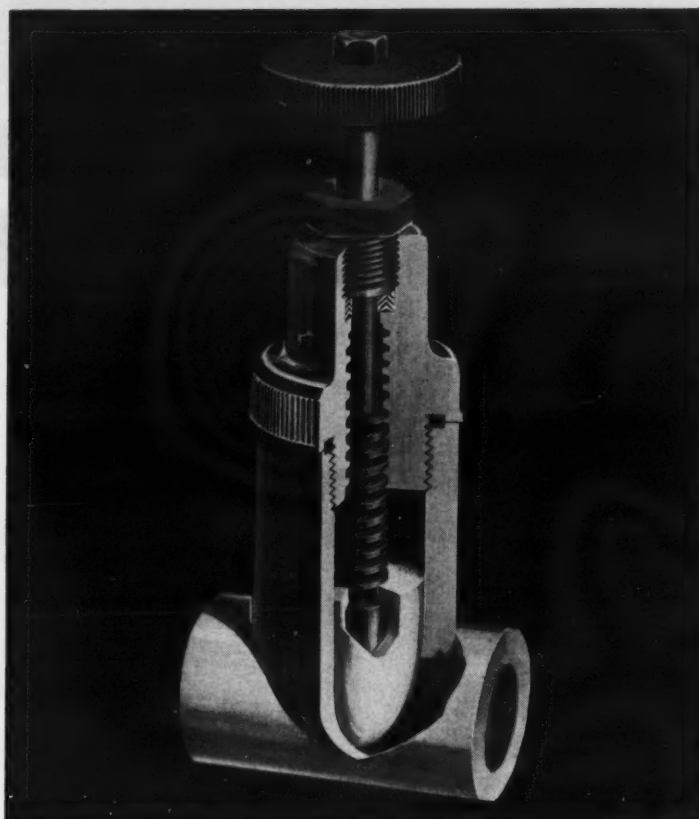
■ CHEMICALLY RESISTANT ■ NON-CONTAMINATING
■ NON-GALLING ■ NOT SUBJECT TO GALVANIC CORROSION
■ EASILY MAINTAINED ■ LIGHT WEIGHT ■ LOW COST
■ FLEXIBLE CAP ABSORBS ABRASIVE ACTION OF SUSPENDED SOLIDS ■ NO-PRESSURE-DROP FULL FLOW

Here's a unique new valve design, in plastic, that combines the full-flow, non-pressure-drop characteristics of a gate valve with close throttling control usually possible only in a globe valve! **Unique Design:** This plastic valve is not a carry-over of metal valve designs; rather it is a completely new design conceived in plastic: the ONLY plastic gate valve that is also throttleable for flow control. Easy replaceability of flexible synthetic cap minimizes maintenance. When fully open valve back-seats, taking pressure off DuPont Teflon V-ring packing. Use it for all your corrosive, contaminable, and run-of-process fluid handling situations. Available in PVC, Kralastic, or Penton all-plastic construction, in 1/2"-2" sizes, and with screwed, socket-weld, or flanged ends.

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VANTON PUMP & EQUIPMENT CORP.

DIVISION OF COOPER ALLOY CORP., HILLSIDE, N. J.

SPECIALISTS IN PLASTIC FLUID HANDLING. PLASTIC PUMPS, VALVES, PIPING, FITTINGS, SPECIALTIES



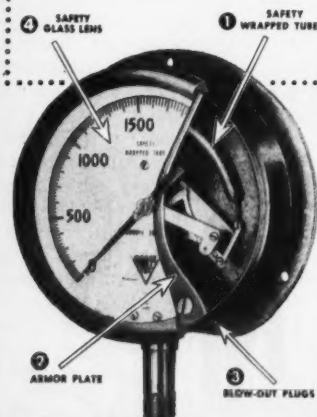
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KUNKLE GAUGES for Process Applications

AVAILABLE IN MANY
TYPES and SIZES
15 p.s.i., or 30" of vacuum, to 20,000 p.s.i.



...and the NEW KUNKLE SAFETY CASE GAUGES



...safer because:

1. Rifle-bored steel Bourdon tube is safety wrapped.
2. Armor plate behind dial.
3. Blowout plugs located for downward relief.
4. Shatterproof dial lens.
5. Solid back gives full area protection.

by the
MAKERS
of
DEPENDABLE
KUNKLE
VALVES

WRITE FOR CATALOG & ENGINEERING DATA

KUNKLE VALVE CO. • FT. WAYNE, IND.

Check 2933 opposite last page

Dwyer PITOT TUBES

Accuracy
at a
glance

INCH-GRADUATED ON
BOTH SIDES TO SHOW
DEPTH OF INSERTION

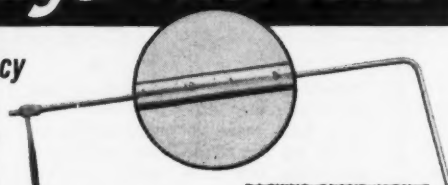
For quick, easy centering and accurate traversing of any duct, use a Dwyer Pitot Tube. Available in a complete range of sizes from 12" to 60"—all featuring lifetime stainless steel construction. And with the mounting adaptors shown below, they're equipped for air velocity and static pressure measurements in any kind of service. Dwyer Pocket-Size Air Velocity Calculator supplied with each Pitot Tube.

Write for bulletin B-12

F. W. DWYER MFG. CO.

P. O. BOX 373-CF

MICHIGAN CITY, INDIANA



PACKING GLAND MOUNT

Leak-proof, high-strength mounting. Stainless steel with asbestos-graphite seal. For hazardous gases, etc.

DUCT ADAPTOR

Split ferrule allows tube position to be changed without disconnecting. Solid brass construction.

SPLIT FLANGE MOUNT

Split halves, neoprene gasket and hardware supplied for attaching to any duct. Fits all standard pitot tubes.

St. Lawrence Seaway

From page 27

Imposition of tolls on the Welland Canal will increase the cost of landing coal and iron ore on the docks of our steel industry and, if this leads to an increase in the price of steel, it will affect prices of manufactured goods throughout the country.

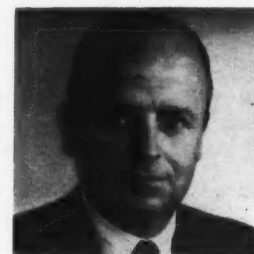
In the long run, however, the Seaway will bring a brighter future to the whole of Southern Ontario. It should help many of our firms to export their products; it will increase supplies of cheap electric power, and should also lead to an unspectacular but steady growth in industrial development in which the expansion of our chemical industries will be quite noticeable. Already, Hamilton has seen the location of two major chemical processing plants, and it is hoped that these will be the forerunners of other chemical developments in this area.

J. PETER GRACE

President, W. R. Grace & Co.

On March 16, the Federal Maritime Board awarded the Grace Line the first contract to insure American flag services on a United States essential foreign trade route from the Great Lakes to ports in the Caribbean and South America.

This is the first United States flag service to be provided from the Great Lakes to foreign ports as well as the first subsidized service on an es-



J. P. GRACE

sential foreign trade route from the Great Lakes.

Our decision as carriers to enter this route reflects Grace Line's optimism with respect to the prospects in foreign

Check 2934 opposite last page

CHEMICAL PROCESSING

trade with Latin America, the fastest growing area in the world.

We are not expecting that this new activity will simply divert cargoes that would otherwise have been loaded on or discharged from vessels in Atlantic coast ports. We expect that the tremendous improvement in sea communications will boost the volume of business between these two great markets to new heights. We believe it will also generate interest in foreign trade on the part of certain U.S. industrial activities which up to now have not gone beyond domestic markets.



THOMAS H. COULTER
Chief Executive Officer
Chicago Association
of Commerce and Industry

The fourth segment to round out the transportation superiority (of the Midwest) has been added to give the area the most complete transportation facilities in the world today.

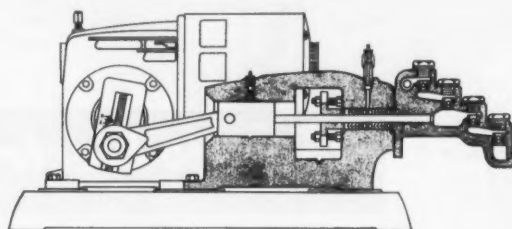
This summer will see traffic through the St. Lawrence Seaway and the Great Lakes never envisioned by the Seaway's staunchest advocates. For the first time in history, a major fleet of the United States Navy will proceed from the Atlantic to Chicago.

What follows after the glamorous events of summer 1959? Tremendous growth of industries which can profit by proximity to water transportation. Shipbuilders will build more and more craft especially suited to the Seaway trade. The Navy will expand its building program on the Seaway to take advantage of industries close at hand and to enjoy the benefits of shipyards and bases located in the safety

HOW TO METER ACIDS ACCURATELY AGAINST PRESSURE

Corrosive liquids present two major obstacles to achieving maximum metering accuracy, economy, and safety. For one thing, corrosion can introduce an intolerable ever-changing volumetric error. For another, corrosive liquids must be retained by the pump at all times. Leakage can endanger personnel and necessitate the premature replacement of pump parts and associated equipment.

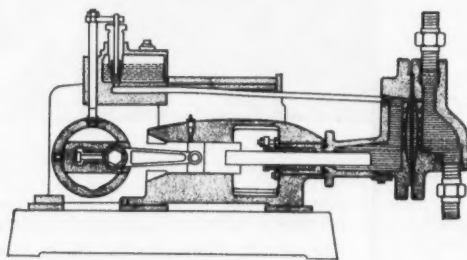
But both obstacles can be successfully overcome. First by choosing the right pump for the metering job at hand. Second, by making sure that all wetted parts of the pump chosen are inert to the liquid being metered. Here are some ideas based on practical acid metering experience that may help you to choose the one best controlled volume pump for your metering needs.



Packed Plunger Pumps

For the majority of mildly corrosive liquids, low cost packed plunger pumps have proved themselves entirely adequate. Some thirteen materials of construction are standard on packed plunger pumps, running from cast iron to Hastelloy B and C, more than enough to satisfy mild corrosive metering requirements. Capacities to 2056 gph, pressures up to 50,000 psi.

An added tip: Standard Milton Roy motor driven pumps in corrosive service can be equipped with "catch-all" yoke type gland followers.



Diaphragm Liquid Ends

When the liquid to be metered is highly corrosive or otherwise dangerous, a controlled volume pump with diaphragm liquid end is the best choice. A plastic or

stainless steel diaphragm positively separates the process liquid and the plunger. The plunger displaces a hydraulic fluid which in turn strokes the diaphragm to create pumping action through the ball checks. Consistently high accuracy is achieved through unique design features. As the illustration shows, positive mechanical action bleeds any air or vapor from the hydraulic side between strokes and corrects liquid volume if necessary. Internal liquid end design also automatically eliminates bubbles from the process liquid side.

Very often, a pump chosen for mild corrosive service is obsoleted by a process change specifying a more highly corrosive liquid. But this waste is neither necessary nor desirable. The diaphragm liquid end illustrated can easily be substituted for the conventional liquid end on any standard motor driven controlled volume pump, bringing the entire metering system up to date at little extra expense. *Designs of this type will handle up to 400 gph against heads to 2700 psi.*

Totally Immersed Liquid Ends

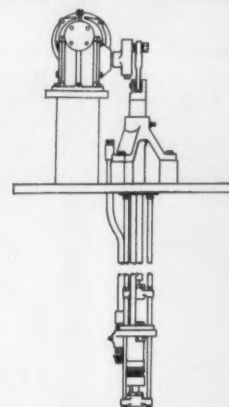
Special metering problems demand special pump designs. For example, acids with high vapor pressure or high specific gravity must be pumped with limited suction lifts and generally require suction heads. The ideal answer is the standard Merse-metric® controlled volume pump. Pump drive and motor are mounted on the tank top, but the liquid end is completely submerged to a depth of up to fourteen feet. This same design feature also eliminates the need for tank connections below liquid level, and permits chemicals to be metered directly from storage.

The maximum safety-minimum handling Merse-metric design is just about standard for metering sulfuric acid for demineralizer regeneration and pH control of cooling tower water and deaerator effluents. *Capacities up to 218 gph, pressures up to 1200 psi.*

The Acid Metering System

You can be fairly sure of making the right choice only if you consider *all* the factors. Here's a convenient checklist of a few points that are often overlooked:

- Is the entire system corrosion-resistant . . . storage tank, suction and discharge piping, controlled volume pump, and relief valve?
- Have you thoroughly considered the physical properties of the liquid? High vapor pressure or high specific gravity liquids may demand a suction head.
- Have you considered plant and personnel safety under all possible conditions?
- Have you considered maintenance as well as first cost in determining the economics of the system?



If precision pumping of dangerous chemicals is one of your problems, look again to Milton Roy's 25 years of experience for your most economical solution. Write for a general introduction to controlled volume pumping in Bulletin 553-1. Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pa.

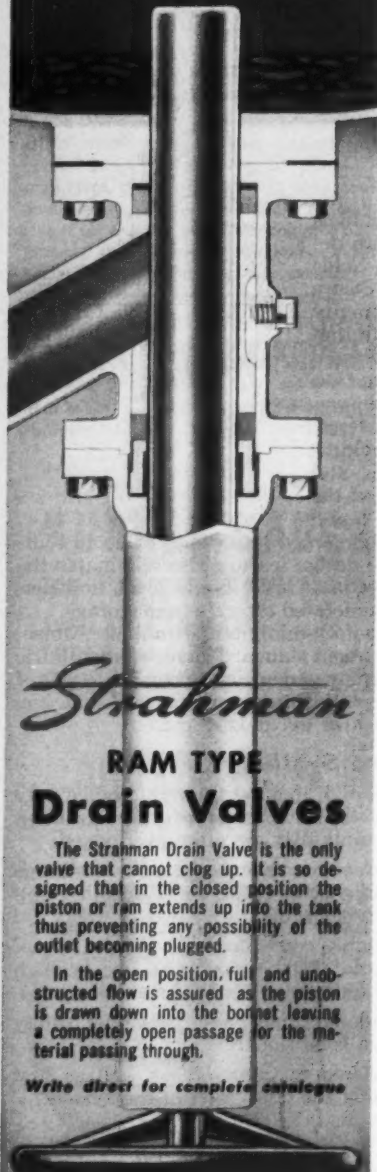
Controlled Volume Pumps • Quantichem Analyzers • Chemical Feed Systems



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a
FLUSH BOTTOM VALVE
that
WILL NOT CLOG UP

Designed for Chemical and
Pharmaceutical Industries



Strahman
RAM TYPE
Drain Valves

The Strahman Drain Valve is the only valve that cannot clog up. It is so designed that in the closed position the piston or ram extends up into the tank thus preventing any possibility of the outlet becoming plugged.

In the open position, full and unobstructed flow is assured as the piston is drawn down into the bonnet leaving a completely open passage for the material passing through.

Write direct for complete catalogue

STRAHMAN
VALVES, INC.
NICOLET AVE., FLORHAM PARK, N. J.

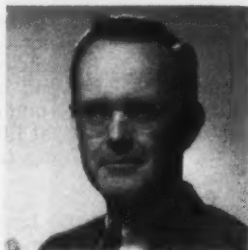
Check 2936 opposite last page

St. Lawrence Seaway

From preceding page

of inland waters.

Midwesterners are fortunate. Their future takes on additional brilliance with the coming of the new St. Lawrence Seaway.



Senator PHILIP A. HART
(D., Michigan)

Opening of the St. Lawrence Seaway presents possibilities for the future which quite stagger the imagination. Ready access to the sea will mean cheaper marketing of our products and hopefully this will mean factories will find new customers in the United States and other lands.

In order to keep this commerce flowing, however, we are going to have to restrain ourselves from raising tariffs and imposing quotas on goods from other countries. World trade will not be sustained by a one-way flow of goods from the U.S.

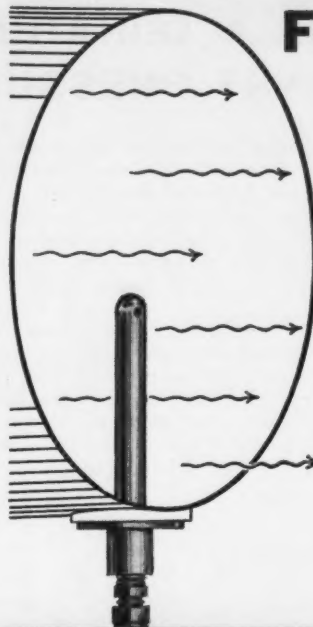
With the flow of commerce there has historically been an interchange of ideas and cultures to the mutual benefit of the world's peoples. This, too, we can anticipate from the opening of the Seaway, and it will be no less welcome than the monetary benefits. With increased association can come greater understanding, which is the soundest basis for world peace.

LEWIS G. CASTLE
Administrator, St. Lawrence Seaway
Development Corporation

This spring ushered in the era of the modernized St. Lawrence Seaway. Many people have forgotten (and others have never known) that the waterway is not a new trans-

Non-Cooled Thermocouple For High Velocity Gas Streams

At Temperatures Up To 3600°F.



This new thermocouple can be used without water or air cooling in the high velocity gas streams of jet engine afterburners and ramjet and rocket exhausts. It includes a cermet radiation shield and support tube. Conduction errors from cooling are eliminated and installation is simplified. Radiation losses are reduced about 60%. In a typical application this probe endured temperature cycling from 1500 to 3000°F. at a 1500 ft./sec. velocity for 20 hours with no failure. Temperature changes of 2000°F./sec. have created no adverse effects. Conductors used are Platinum 30% Rhodium/Platinum 6% Rhodium to 3000°F., and Iridium Rhodium/Iridium to 3600°F. Contact Thermo Electric for adaptation of this thermocouple to your needs.

Write For EDS-36-R.

Thermo Electric CO., INC.
SADDLE BROOK, NEW JERSEY

In Canada:
THERMO ELECTRIC (Canada) LTD.,
Brampton, Ont.

Check 2937 opposite last page

MOST MAJOR U.S. CHEMICAL PRODUCERS REDUCE COSTS with PANALARM ANNUNCIATORS



MAXIMUM INFORMATION on all process variables . . . the result of 10 years system engineering by Panalarm and major chemical producers. That's why Universal Series 50 is the chemical industry's most informative annunciator. Trouble anywhere is signalled instantly—before it can grow big and expensive. "Off-normals" are pinpointed instantly, accurately for fast remedial action, reducing costly downtime.

Economical, highly flexible design facilities system expansion. Can be simply adapted to your exact requirement, avoiding costly custom designing. Proven components—e.g., almost 1,000,000 dependable Panalarm developed relays have been used in Panalarm Annunciators.

Ask your nearby Panalarm sales engineer to show you why Universal Series 50 is the chemical industry's No. 1 annunciator choice . . . how its adaptability and reliability can help increase your profits . . . by producing maximum information and reducing costly downtime. No obligation, of course.

Write for Catalog 100 B today.



Division of

PANELLIT, INC.

7401 No. Hamlin Ave., Skokie, Ill.

Check 2938 opposite last page

portation route, but is, instead, a vast improvement over an old and well-established artery of transportation.

The enabling legislation of both participating nations, the United States and Canada, provides for full amortization within 50 years of the cost of construction, operation and maintenance through the levying of tolls against users of the Seaway.



L. G. CASTLE

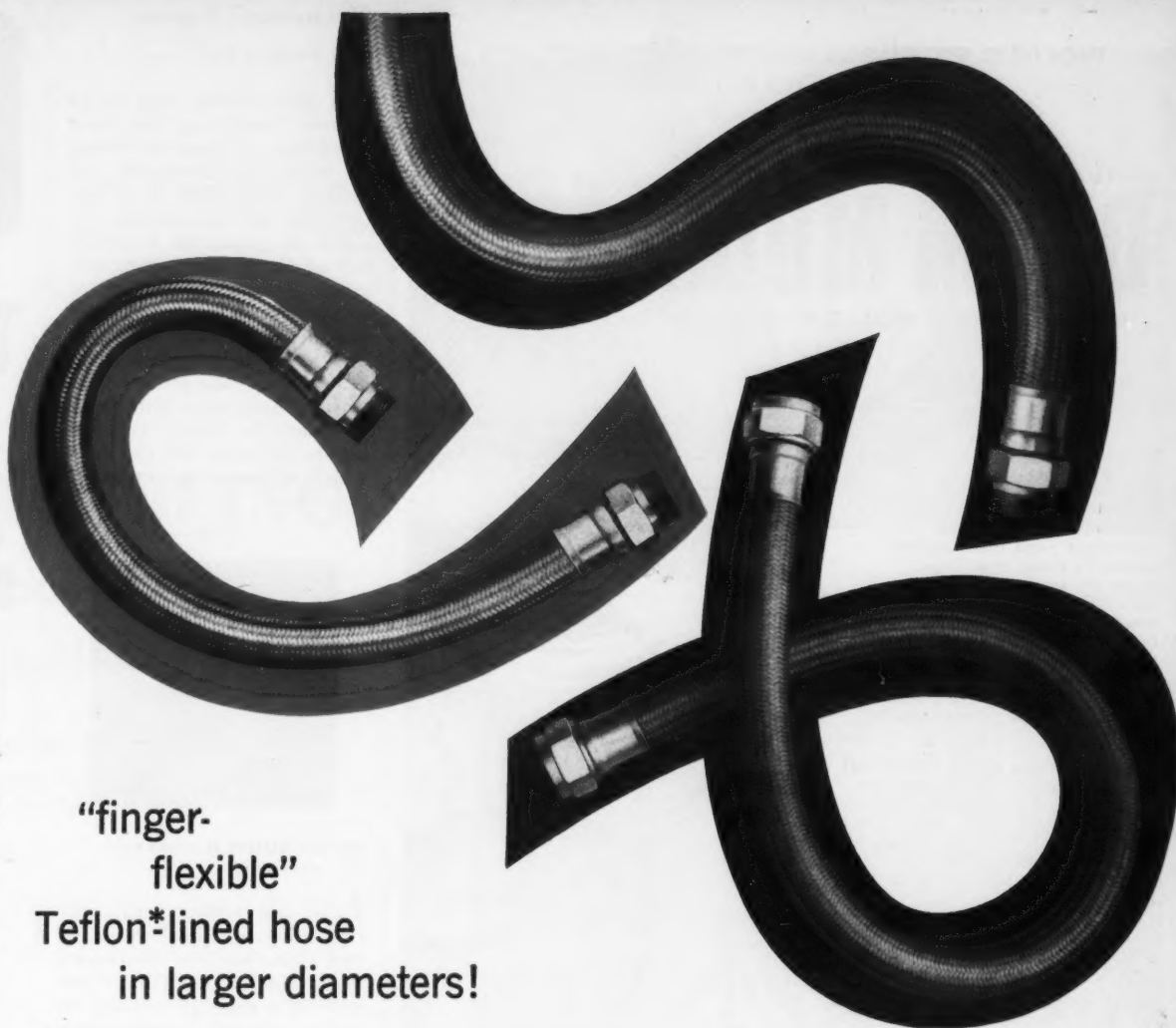
In determining the levels at which these tolls should be set, the tolls committees of the two nations conservatively estimated St. Lawrence tonnage to be 25 million tons in 1959 and to attain 50 million tons by 1968, with the Welland Canal tonnage increasing from 40 million tons to 60 million tons during the same period.

The St. Lawrence Seaway is constructed of much more than dirt, concrete, and steel. By far the most prevalent commodity built into it is opportunity. With opportunity built in, the future of the Seaway depends upon those who take advantage of it.

H. C. BROCKEL
Milwaukee Municipal Port Director

The long political and regional struggle for the St. Lawrence Seaway is finished. There can be little question concerning its significance and its timeliness.

Its timeliness is that it comes upon the North American transportation scene just as America moves into an era of reliance upon distant places for essential raw materials. As we diligently seek new raw material sources, with equal diligence we seek new mar-



**"finger-
flexible"
Teflon*-lined hose
in larger diameters!**

Only TITEFLEX has it! Its name: Springfield "400"***

For the first time you can buy Teflon hose that *really* flexes, even in *large* diameters. TITEFLEX makes it with an exclusive process, and its minimum bend radius is only 3½ times the hose diameter!

CHECK THESE WANTED FEATURES:

- Often, a shorter Springfield "400" assembly can replace extruded hose at a saving in money.
- Available in lengths to 25 feet (soon to 50!) and diameters of ¾", 1", 1¼", 1½", 2"—and soon—3" and 4".
- Teflon is tough, friction free, lightweight, inert, corrosion and temperature resistant, with extra long fatigue life.

- Reinforced with TITEFLEX "zero motion" braiding.
- Assembly terminations: Elbow fittings of any configuration to your order. JIC Swivel Nuts and Male Pipe Threads, AN Swivel Nuts, MS 20756 Flanges. All guaranteed failure-proof to burst pressure of hose.

Already, Springfield "400" is in use for transferring acids, alcohols, methanol and most corrosive fluids . . . for live steam lines . . . for extremely high and low temperature systems. Our data sheets contain answers to your needs. Get a copy from your TITEFLEX distributor or write direct to us. Stocks available at authorized distributors in your area.

*Teflon is a duPont trademark

***T.M. of Titeflex, Inc., Pat. Pending

**SPRINGFIELD "400" DIMENSIONS
AND PERFORMANCE**



(Hose assemblies rated for performance at operating pressures shown—through temperature range of -65° to 400° F.)

Nom. Size	"B" Inside Dia.	"A" Outside Dia.	Approx. Weight Lbs/Ft	Min. Bend Radius	PRESSURE, P.S.I.		
					Min. Burst	Max. Test	Max. Working
¾"	.784	1.067	.34	2½"	2,000	1,000	500
1"	.992	1.262	.40	3½"	2,000	1,000	500
1¼"	1.290	1.555	.50	4"	1,400	700	350
1½"	1.522	1.790	.60	5"	1,000	500	250
2"	1.987	2.315	.94	6¾"	1,000	500	250

titeflex inc. springfield mass. PACIFIC DIVISION • SANTA MONICA • CALIFORNIA



Check 2939 opposite last page

world's smallest corral
for 200 horses*
(*horsepower, that is)

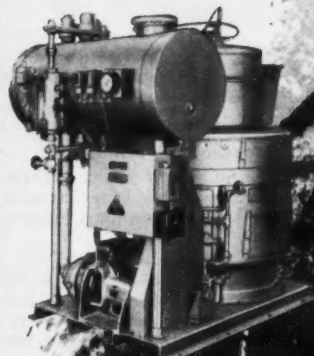
...THE VAPOR HEATING CORPORATION

DRUM MODULATIC

WATER TUBE BOILER—200 BHP in only 6' x 6'

Most heat and power packages let their horses run wild—spread them all over your plant...and that's mighty expensive range area. Vapor packs the same number of horses in about one-quarter the space of what old-fashioned boilers need. Even if you only valued inside area at \$20.00 a sq. ft., you'd save a whopping \$2400 on space alone. And you'd save plenty more on maintenance and long life...the simple fact is this:

MODULATICS NEVER WEAR OUT
Ingenious design makes every part accessible—easily replaced should the need arise. And, Vapor guarantees their Modulatic coils 5 full years including up to \$50.00 labor allowance! Sizes: 20 to 200 HP...670,000 to 6,690,000 BTU per hr.



DEFERRED PAYMENT PLANS AVAILABLE IF YOUR CASH HAS OTHER WORK TO DO

VAPOR HEATING CORPORATION

30 East Jackson Boulevard
Chicago 4, Illinois
Dept. 3-G

Send me free literature: ☐ Drum Modulatic Bulletin 475;
☐ Modulatics for pressures to 1000 psi, Bulletin 586;
☐ Extended Payment Terms Bulletin 486

Name _____

Address _____

City, Zone, State _____

Check 2940 opposite last page

St. Lawrence Seaway

From preceding page

kets. The Seaway will be an efficient entryway for vast quantities of raw materials; an outlet for foodstuffs and factory production of a variety beyond enumeration.

For the first time the land-locked Great Lakes fleet can move to tidewater, and some 80 percent of the world shipping fleets can enter and serve this new Mediterranean Sea. The big question for the Seaway is how soon will it be necessary to enlarge and duplicate its locks and channels, which will soon be working at capacity.



Senator HUBERT H. HUMPHREY
(D., Minnesota)

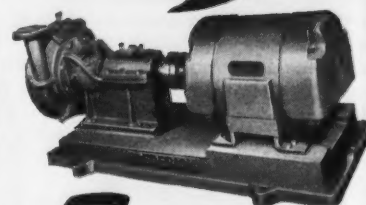
Low cost water transportation will bring new importance and a new boom to the economy of the Middle West. There will be a gigantic increase in traffic carried directly from the Great Lakes to overseas ports.

I predict that the St. Lawrence Seaway will handle more than 60 million tons of cargo a year by 1969. Furthermore, a brand new passenger traffic industry will spring up when the people of the Midwest learn they can cross the Atlantic by ship without stopping at East Coast traffic centers.

The lowered cost of exporting and importing will give a terrific boost to all parts of our economy, opening new opportunities for business enterprise and employment. I believe these opportunities will make the Midwest heartland the fastest growing area of America in the next 10 years.

(This is the first part of a two-part presentation on the future of the St. Lawrence Seaway. Watch for the second part in the August issue.)

Custom-built for
**EFFICIENT
DEPENDABLE
SERVICE**



**Frederick
SSV PUMPS**

**Enclosed Impeller
and Open Impeller Types**

You're sure of maximum service and output with minimum maintenance or production down time with Frederick SSV Centrifugal Pumps because each pump is custom-made to fit your particular operation—whatever the consistency or type of liquid you're moving.

SSV PUMP FEATURES

- Pump sizes from 1" to 4" discharge openings.
- Pump capacities from 50 up to 700 U.S. GPM.
- Heads from 30 up to 220 feet.
- Pump speeds can be varied to suit the driving media and operating conditions.

CONSTRUCTION ADVANTAGES

Pump casings are vertically split for easy accessibility. Mounted on a swivel to permit placing discharge in any desirable position. Pump openings, both suction and discharge, flanged to permit easier connection and disconnecting to joints. One-piece impellers, securely attached to shaft by stout key and lock nut, or threaded, give long service. Pump bearings mounted in sturdy frame horizontally split for easier accessibility. Extra long stuffing box provides for oversize stuffing. Mechanical seal also available for minimum leakage. Pump coupling flexible for direct connection to drivers or can be arranged for belt drive. Pump speed, pump openings, etc. are selected to suit your particular requirements.

Write for Bulletin No. 107



FREDERICK IRON AND STEEL, INC.
FREDERICK Est. 1890 MARYLAND

Check 2941 opposite last page
CHEMICAL PROCESSING



Screw conveyor carries ingredients from track pit to this bin-loading station where Tote Bins are filled through nylon sleeve. When one bin is full, flow diverts automatically to next empty one



At bin discharge station, Howe dual-arc scales are preset for discharge of bins in proper proportions. Tilts empty bins into screw conveyor under them, which carries proportioned mixture to process batch hoppers

BULK HANDLING

**cuts labor costs,
simplifies quality control**

**Ceramics supplier finds that his 250 sealed bins
reduce storage space needs, promote cleanliness**

Problem: Labor costs were high in manual handling of bulk ingredients at The O. Hommel Company, Pittsburgh, Pa. Excessive supervision was required to maintain quality standards, too, because of the manual handling methods.

Ingredients were received in bags and stored inside until needed. Then they were slit open, and the materials weighed out by hand and dumped into process hoppers.

Hommel is a ceramic materials supplier manufacturing the three basic types of frit—porcelain enamel ground coat, cover coat, and pottery frit.

Solution: Hommel switched to bulk handling. Company uses 250 sealed, 74-cu-ft aluminum bins in conjunction with a six-bin automatic-weighing discharge platform.

Ingredients are delivered by bulk hopper car direct to plant's railroad siding. From here they are screw-conveyed through a Hommel-designed bulk pit, under the trackage, to bucket elevator. The elevator lifts them to a dual-bin filling station where they dis-

charge into bins through a nylon sleeve. As one bin fills, screw conveyor automatically carries material to the next empty bin.

Full bin is removed by fork truck and taken to storage area. Empty bin is put in its place at filling station. Each bin holds 4000-6000 lb of ingredient, depending on bulk density.

As needed, fork trucks take bins from storage to six-bin discharging station. Here the six or less major ingredients needed in a given batch discharge together, semi-automatically.

Dual-arc Howe scales are used here. Dials are set for desired amounts, and required poundage is introduced into screw conveyor via tilts which eject bin contents by tilting them to 45° angle. The conveyor transfers ingredient mixture to vibratory conveyor which carries it to Hommel-designed batch hoppers.

Results: Handling-labor requirements have been reduced substantially. A bin can be interchanged at tilt station in

four minutes or less. Daily interchanging takes less than one manhour—in opposition to several men working continuously at the same work under the old method. The only hand-introduction now employed is for extremely small-quantity ingredients.

More-accurate weighing of ingredients has meant easier end-product quality control. Bulk handling has eliminated the recurring container costs

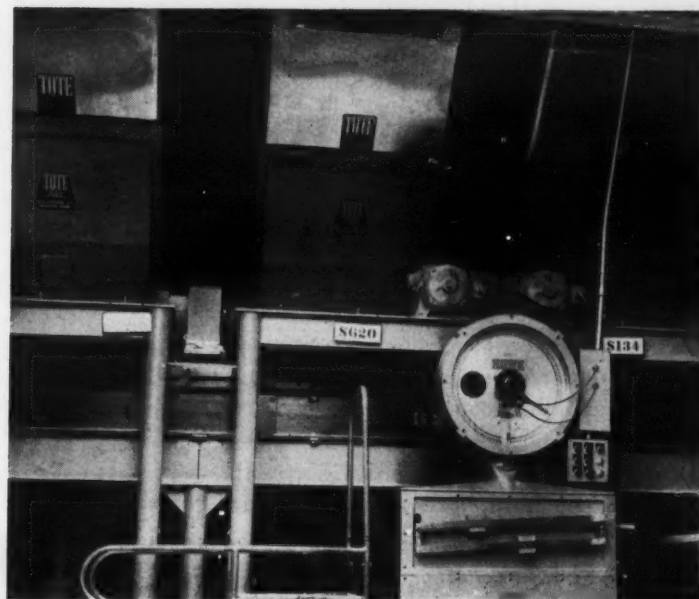
of the 100-lb bags, too.

Housekeeping is much improved. Morale is higher since the handling is much less tedious, cleaner, faster, easier.

Storage of ingredients in the bins has achieved more than 15% space savings.

(Tote Bins and Tote Tilt discharge system were supplied by Tote System Inc., Beatrice, Nebraska.)

Check 2942 opposite last page.



NEW

*Savings and efficiencies
in Gas Scrubber Applications*

with the

TURBULAIRE-DOYLE SCRUBBER

With addition of the Turbulaire-Doyle Scrubber to its line of advanced dust, fume and fly ash collection equipment, there is no industrial gas cleaning problem that Western Precipitation cannot handle with equipment of its own design. This assures your dust and fume control problem receiving the benefit of the industry's most complete "know-how" in all phases of gas cleaning operations.

The Turbulaire-Doyle Scrubber—a development of The Consolidated Mining and Smelting Company of Canada Limited and widely used in its own diversified operations—is now made available to industry by Western Precipitation Corporation under a license arrangement with Cominco.

Actual plant records, compiled over long periods of service, show the Turbulaire-Doyle Scrubber to be unique among commercially-available scrubbers in the multiple advantages it offers...

- ★ **High Collection Efficiencies**—generally 97% to 99%!
- ★ **Fine Particle Collection**—including those in the fume range!
- ★ **Low Liquid-to-Gas Ratio**—only 1 to 5 GPM per 1000 CFM!
- ★ **Wide Application Flexibility**—readily adaptable to various types of corrosion-resistant materials!



COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
THERM-O-FLEX Hi-Temp Filters
TURBULAIRE-DOYLE Scrubbers
HOLO-FLITE Processors
HI-TURBIANT Heaters

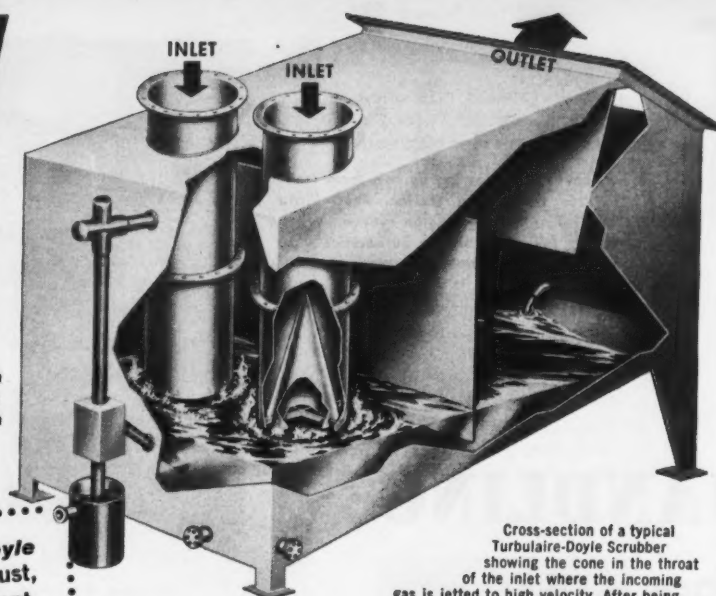
WESTERN PRECIPITATION CORPORATION

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., 8285 Mountain Sights Avenue, Montreal 9



Cross-section of a typical Turbulaire-Doyle Scrubber showing the cone in the throat of the inlet where the incoming gas is jetted to high velocity. After being cleaned in the scrubbing fluid, the gas passes over spray eliminator baffles before it is discharged. Collected material is carried away by the circulating scrubbing liquid—is recovered as a liquid concentrate or slurry.

SIMPLE, TROUBLE-FREE DESIGN

The Turbulaire-Doyle Scrubber impinges dust-laden gas at high velocity into a bath of scrubbing liquid. The high velocity forces the gas and dust particles to penetrate deeply into the liquid for complete wetting and cleansing. A cone in the gas inlet nozzle, just above the surface of the scrubbing bath, provides the jetting action that assures outstanding performance from this unit. There are no moving parts, nothing to require frequent maintenance!

If you have dust or fume control problems where scrubber types of collectors are applicable, it will pay you to investigate the years-ahead advantages of the Turbulaire-Doyle Scrubber. Write, wire or phone the Western Precipitation office nearest you for further details.

TYPICAL APPLICATIONS INCLUDE:

Cleaning Gases from sintering machines, blast furnaces, roasters, dryers, smelters, crushers, screens, ventilators etc., in a wide range of chemical, metallurgical, rock products, and waste disposal operations.

Cooling and Humidifying Gases from fertilizer, acid, carbonating, smelting, alloying and reclaiming operations where cool, moist gases are necessary for proper processing.

HANDLING & PACKAGING

**Totalizes material
on belt conveyor**

Compensates for variations
in speed of belt

Uses: Measuring and totalizing weight of material flowing on belt conveyor.

Features: Compensates for belt slippage and speed variations in conveyor-drive motor due to line and load fluctuation.

Description: Known length of belt is supported and weighed, giving accurate measure of lb/ft on belt. Belt speed is determined by pickup roll of known circumference. These two variables are then integrated by ball-and-disc integrator to provide total weight, which is indicated by totalizing register.

Flexure plate platform scale is held continually in balance by motor driving the poise. Poise position is translated by series of chains and gears to a dial position on scale front. This indicates directly the lb/ft on belt, and is a reasonable indication of tons/hour going over belt.

Variations in belt speed are compensated for by means of a belt-speed-measuring idler applied as input to integrator disc.

Dial reading, or lb/ft, is translated into linear motion positioning integrator ball carriage. Output shaft speed, therefore, is proportional to lb/hr. Output shaft carries a magnet assembly which actuates a mercury switch on each revolution. This in turn advances totalizing register accumulating the weight.

(Model T18 totalizing belt conveyor is product of Thayer Scale Corp., Pembroke, Mass.)

Check 2944 opposite last page.

Crawler tractors, diesel-powered, are presented in two six-page specification sheets. Large, easily read cutaway views are featured, with marginal notes providing quick and easy reference. These are 125-drawbar-hp units. Spec Sheets MS-1192 and MS-1284—Construction Machinery Div., Allis-Chalmers Manufacturing Company, Milwaukee 1, Wis.

Check 2945 opposite last page.

Check 2943 opposite last page

THAT'S
INTERESTING

Acrobatic rats

Trained rats are giving an assist to scientists at the Chas. Pfizer & Co. research laboratories in their search for clues to mental drug effects. A number of drugs were tested for their effects in modifying trained behavior of the rodents. Rats were trained to press levers in the presence of various signals. Each training cycle consisted of three different types of behavior. In the first, rats were taught that pressing a lever was the way to avoid an electric shock. In the second, lever-pressing was rewarded with a brief offer of a dipper of sweetened milk. In the third, nothing happened when the lever was pressed, so that the rats soon learned not to press during this period.

For more information on product at right, specify 2946 see information request blank opposite last page.



Towmotor one-truck "fleet"!

Operating one of the new Towmotor Fork Lift Trucks is like having a fleet. A *multiple-threat* to your material handling costs!

Fifteen standard Towmotor fork lift trucks are so compact they drive under *six-foot doorways* . . . deposit loads *inside* boxcars and trailers . . . enter *elevators* for fast floor-to-floor service . . . skim through *4-foot aisles* safely. And all stack capacity loads to maximum heights, indoors and outdoors, with positive control!

Let us send you complete information. Ask for *Certified Job Studies* applying to your own business — and the new *Pace-Maker* Booklet SP-23. Write Towmotor Corporation, Cleveland 10, Ohio.



-GERLINGER

LEADERS FOR 40 YEARS IN BUILDING
FORK LIFT TRUCKS, CARRIERS AND TRACTORS

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

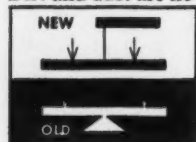
NEWS ABOUT SCALES



How do they build unvarying accuracy into this remarkable new kind of weighing instrument?

For 7,000 years men have employed the multi-part pivot balance to compare weights. As the parts of their pivot joints wore, the problem of retaining accuracy became more and more acute. Then in 1956 the United States issued a patent for a "Thayer Flexure Plate" Leverage System. A team of engineers and businessmen, aware of industry's great cumulative loss of materials in weighing operations, had devised a revolutionary new scale. Knife-edge pivots that progressively wear and change were replaced by Thayer Flexure Plates that move only .001", yet accurately reflect the minutest changes in weight. This firmly joined lever withstands

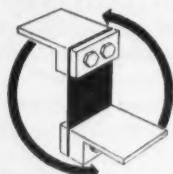
shocks and vibrations indefinitely. Dirt and dust are no longer a problem.



Thayer guarantees this leverage system accurate for the life of the scale.

How Can It Save You Money Year After Year?

Working in conjunction with straight electrical controls, it forms the most reliable, low maintenance system ever devised to control processing or materials handling by weight. Literature on its application to filling, batching and checkweighing operations is available on request.



THAYER SCALE

AUTOWEIGHTION SYSTEMS FOR FILLING,
BATCHING AND CHECKWEIGHING

THAYER SCALE CORP. • 6 THAYER PARK, PEMBROKE, MASS.

Check 2947 opposite last page

MATERIAL HANDLING and PACKAGING



**More efficient scheduling of
fork-lift trucks and less
backstrain result as . . .**

Problem: Manual pallet handling placed human-reach limitation of five on number of empty pallets which could be delivered at one time to bag-loading point by fork-lift truck, at Tuscola, Ill., plant of U.S. Industrial Chemicals Co., Division of National Distillers & Chemical Corporation.

Pallets stacked more than five high would be too awkward for men to unpile. Also, manual handling of 90- to 125-lb pallets caused certain amount of backstrain among personnel.

Due to carrying such non-maximum loads, fork-lift trucks could not be efficiently scheduled.

Solution: An automatic pallet dispenser was installed.

It consists basically of vertical magazine, which holds a stack of empty pallets, and adjoining horizontal conveyor. Empty pallets are placed in magazine by fork-lift truck. Pushbutton control by operator releases one pallet at a time from bottom of stack along conveyor.

Pallet moves out of magazine from under stack, through side slot, and stops at point alongside on conveyor. After pallet has been loaded, operator touches control button to repeat cycle. As empty pallet moves into loading position, loaded pallet moves on down conveyor.

Fork-lift trucks pick up loaded pallets from any position on conveyor. Limit



▲ Pallet-retaining latches on reciprocating bar of conveyor are spaced five feet apart to keep pallet loads separated for easier pick-up by fork-lift truck

◀ Magazine of dispenser can receive stack of up to 20 pallets from fork-lift truck. Pallets are dispensed one at a time along conveyor and located at station at right in photo

Automatic pallet dispensing takes over

switch prevents loaded pallet from moving off end of conveyor.

Release of pallets one at a time from magazine is accomplished by means of two ratchet devices operated by motor. Devices are on opposite sides of pallets. They are connected by chain drive to synchronize movement.

Reciprocating bar is located along full length of conveyor between two lanes of rollers. It extends completely into base of magazine. Bar has latches located five feet apart to keep pallets evenly spaced outside of magazine on conveyor. Movement of reciprocating bar is controlled by air cylinder.

When bar moves forward,

all pallets are pushed forward five feet on roller conveyor. As bar returns to original position, latches slide under pallets.

Results: Personnel are no longer required to handle the heavy pallets. This has lessened backstrain occurrence and improved morale among employees serving loading lines. Fork-lift truck can now deliver up to 20 pallets to dispenser at one time. This has resulted in better scheduling of trucks.

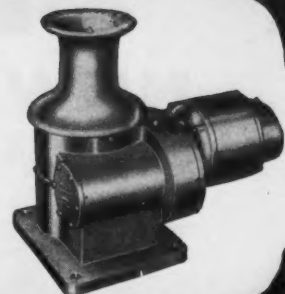
(Automatic pallet dispenser is product of Alvey Conveyor Manufacturing Company, 9301 Olive Street Road, St. Louis 24, Missouri.)

Check 2948 opposite last page.

Webster CAR PULLERS

For Quick, Economical Spotting

One-man, push-button control. Always ready, always safe. The capstans on WEBSTER Car Pullers are designed to give long life to the ropes, and provide the necessary traction for pulling the load. The high-torque, hoist-type, weather-proof motor is an integral part of the unit. Two sizes of 5,000 or 10,000 lbs. rope pull at 40 ft. per min. WEBSTER Drum-Type Car Pullers also available in sizes from 7½ up to 50 hp. Write for literature.



Webster IDLERS

Job-Designed for Top Performance

Perfect and permanent roll alignment, economical operation, and minimum maintenance are built-in characteristics of WEBSTER Idlers. The balanced steel rolls have rounded edges which protect the belt and securely lock in the malleable iron roll ends. Timken tapered roller bearings are oversize to meet overloading and constant operation. Labyrinth seals of metal and felt keep grease in and dirt out. All parts interchangeable. WEBSTER Idlers will help you keep material handling costs down. Write for literature.



Webster CHAINS

Quality-Built for Long Service

For over eighty-two years WEBSTER has manufactured a complete line of standard and specialized cast and steel chains and chain attachment links for use in all industries. WEBSTER chain types include Pintle, Ley Bushed, Combination, Roller, Drag, Bevel and Roller Top Transfer. Our engineering department offers its experience and suggestions concerning designs and the adaptability of chains for meeting your needs. Write for catalog.



WEBSTER MANUFACTURING, INC.
Dept. C-79

TIFFIN, OHIO

Offices in All Principal Cities

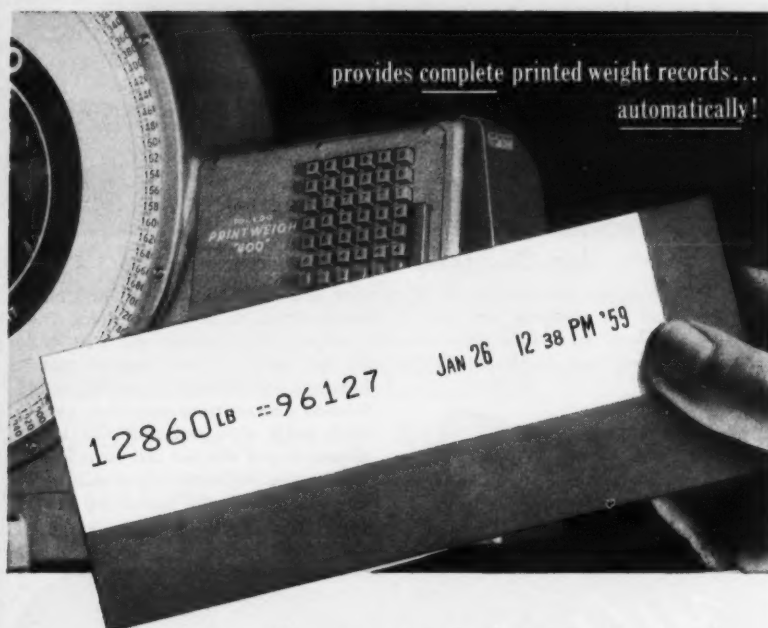


Check 2949 opposite last page



BAN this "birthplace of losses"
... hand-written weight records!

NEW TOLEDO PRINTWEIGH® "400"

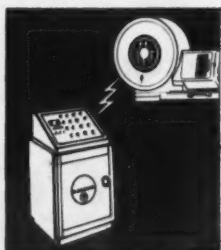


provides complete printed weight records...
automatically!

Human errors in reading, remembering and recording weights are *eliminated* with new Toledo Printweigh "400" . . . product of Toledo's advanced research and development programs to improve weighing efficiency.

Printweigh "400" provides *complete* printed weight records on materials received, processed, transferred or shipped. It's applicable to the full range of Toledo dial scales . . . offers a wide choice of optional features, including a "memory" for printing weight data even after the load is removed.

Printweigh "400" prints full figures, even when using unit weights . . . prints where you wish on 8½" x 11" forms, or on tickets or strips . . . and for positive weight identification, offers 6 to 12 bank selective numbering, or up to 10 weight identifying symbols. Automatic five digit consecutive numbering is also available.



REMOTE RECORDING, TOO!

Printweigh "400" can give wings to weight data by transmitting it to remotely located adding or other office machines. Brings new flexibility and accuracy to weighing operations.

SEND FOR Printweigh "400" bulletin 1157. Or, ask your Toledo representative. **TOLEDO SCALE**, Division of Toledo Scale Corporation, 1423 Telegraph Rd., Toledo 12, Ohio.



TOLEDO®
greatest name in weighing

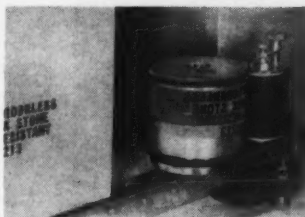
Check 2950 opposite last page

HANDLING & PACKAGING

Type on marker die wheel changed in jiffy

One line can be replaced without shifting others

Uses: Printing drum, or die-wheel, for use on manufacturer's Rolacoder markers—making it possible to use the markers for addressing shipping cases, and printing brand



"Zip-change" marker die wheel

names, colors, flavors, etc.

Features: Entire lines of copy can be removed and replaced in seconds. Any individual line can be changed without disturbing other lines. Type won't shift once in place, however.

Description: "Zip-change" die wheel has vertical line of fixed posts at one position, a line of spring-loaded posts at another. Rubber dies, with brass eyelet fasteners at both ends, are slipped on or off the posts.

Dies are made in logotypes of user-specified wordings, or with channeled face designed to receive individual letters or figures.

(Die wheel is development of Adolph Gottscho, Inc., Hillside 5, N. J.)

Check 2951 opposite last page.

Seals filled bags tightly, locking out moisture

Heat and pressure fix tape in packaging line

Uses: In-plant application of moisture-vapor end seal to multiwall bags. Used with bags having barrier sheets, to provide shipping container for chemicals that must be protected from moisture.

Features: Polyethylene tape closure becomes molten dur-



Quick-change mounting plate facilitates multiple use of Viberlec vibrator.

*Speed the
flow of bulk
materials!*

Viberlec Vibrators Increase production...lower operating costs!

Most efficient and economical movement of bulk materials is provided by Viberlec electric external vibrators—from the finest powders to large solid pieces—through bins, chutes and hoppers.

Compact, powerful Viberlec vibrators offer many advantages:

- Practically silent operation—little or no annoyance to employees.
- Vibrated material may be hot or cold, under pressure, vacuum or controlled humidity. It may be sterile, toxic or protected by an inert atmosphere.
- Operating parts, sealed in steel are *not* affected by dust, moisture, water, humidity, corrosive or contaminated air.
- Rugged construction for years of service.

10' cord and switch with thermal overload protection are included.



WRITE TODAY for full information!

VIBER COMPANY 726 S. Flower St.
Burbank 47,
California



Pioneers and leaders in the manufacture of

VIBRATORS

Check 2952 opposite last page

CHEMICAL PROCESSING

HANDLING & PACKAGING

ing application, and flows around and into stitching perforations. Thus, it locks thread into position, prevents thread's cutting into paper, and fills and seals any holes that result if sewer skips a stitch.

Description: Sealer uses both heat and pressure to apply tapes in wide range of materials, ranging from 1½- to 5-mil polyethylene. It fits into filling line after sewing head, and operates uninterruptedly at regular line speed of 32-48 fpm. It picks up automatically at same height as sewer, thus eliminating any variance between stitching and tape.

Tape is carried with bag between opposing flexible heated belts running between and around two sets of pressure rollers. It wraps around sewing materials, draws seal down against bag end, and seals tightly to both leading and trailing edge of bag.

(MVT sealer is available from Multiwall Division, Hudson Pulp & Paper Corporation, 477 Madison Ave., New York 22, N. Y.)

Check 2953 opposite last page.



Easy pouring

... is assured with five-gal-pail rack. Frame is ¾" 20-ga black-enameled steel tubing; band is 1" 19-ga zinc-plated steel.

(Pour-Easy pail rack is product of Multi-Meter Corporation, 1041 Custer Drive, Toledo 12, Ohio.)

Check 2954 opposite last page.



Eight 1664 cfm Fuller rotary units compressing to 120 psig in tandem sets to four 700 hp electric motors. Compressor plant supplies 13,200 cfm load to oil refinery—for air tools, machinery, and other pneumatic uses.

HOW FULLER ROTARY COMPRESSORS SAVE SPACE - CUT OPERATING COSTS,...at major eastern refinery

To save valuable space in the compressor plant, a large eastern oil refinery installed eight two-stage Fuller rotary air compressors—using a unique drive system. Because of the simple direct-drive through flexible couplings permissible with Fuller rotaries, the refinery was able to drive dual sets of compressors by single, 700 hp. electric motors.

While this means savings in space, the rotaries are also operating with cost-cutting efficiency.

In more than two years of service, these rugged compressors have required no down-time for repairs!

Simple design, rugged construction and precision manufacture are the "secrets" of Fuller rotaries' dependability. The only moving parts are rotor, blades and bearings. There is no reciprocating action—hence no vibration. Smooth, quiet operation permits installation on lightweight foundations, on upper floors—saving in weight, bulk and cost of installation.

For full details on the maintenance-free economy and high performance of Fuller rotaries, write today for comprehensive, illustrated Bulletin C-5A.

C-343
1246

For details on the Fuller product line, see Chemical Engineering Catalog.



FULLER COMPANY

136 Bridge St., Catasauqua, Pa.

Subsidiary of General American Transportation Corporation

Birmingham • Chicago • Kansas City • Los Angeles • New York • San Francisco • Seattle



Check 2955 opposite last page



**SAVE UP TO
\$1500⁰⁰!**

You can get a Case W-5 with 1-cu. yd. bucket for \$5975, F.O.B. factory, plus freight and taxes. Price subject to change without notice.

GET 73% MORE BREAKOUT for faster cycles with new **CASE® W-5 Terraload'r**

You not only save up to \$1500.00 in capital investment... you also gain more work output per dollar with the new high-speed, 3000-lb. capacity Case W-5 Terraload'r.

Unique combination of parallel hydraulic circuit, 30 gpm pump, and special tilt linkage gives the W-5 a breakaway force of 7800 lbs. — 73% more than any competitive machine in its class. Result: operators get heaped loads faster, without "working" the bucket... save valuable seconds in every cycle. In addition, the W-5 gives you:

Faster maneuvering, with power-actuated forward-reverse shuttle shift,

plus front-wheel-drive and rear-wheel power-steer — turns in 10'4" radius.

Better balance, with 24.2% more empty weight on rear wheels, for carrying heaped loads at higher speeds.

More power and efficiency, with heavy-duty Case-built gasoline engine, plus torque-converter drive.

For more information on the new W-5, call your nearby Case Industrial Dealer, or write us direct. Remember, too, Case also builds a larger 6000-lb. capacity 4-wheel-drive Terraload'r, as well as crawler-mounted loaders, from 5/8 to 2-cu. yd. capacity to meet your most exacting requirements.

J. I. CASE COMPANY
Dept. G1549, RACINE, WIS.

CASE®



Producers of the world's most advanced line of wheel and crawler machines for earthmoving and materials handling

Check 2956 opposite last page

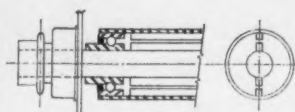
HANDLING & PACKAGING

Conveyed material stopped without shutdown

Uses: Stopping of material on conveyor without shutting down conveyor.

Features: Fluid-filled rollers permit stopping of material without shutdown. No damage to material or conveyor is incurred.

Description: Rollers are 2" diam with 3/4"-diam shafts.



Fluid-filled conveyor roller for stopping conveyed material without shutdown

Degree of slip can be adjusted by varying amount and viscosity of fluid (heavy transmission grease). Unit is engineered to specifications.

(Fluid-filled rollers are a product of Harry J. Ferguson Company, Jenkintown, Pa.)

Check 2957 opposite last page.

Drums heated and cooled by wrap-around unit

Steel 55-gal drum is heated or cooled by single-embossed circular-band-type plate attached to drum by a single-action rotation clamp. Clamp and flexible connections permit rapid changing of plate



Single-action clamp and flexible hose connections permit quick removal and attachment of single-embossed-plate heating and/or cooling element



Eliminate Jams with Cleveland Bin Vibrators



AIR

ELECTRIC

Keep your sand, gravel and cement moving smoothly with Cleveland Bin Vibrators. They're simple to install, they're easy to maintain, and they're low in cost.

If you want air vibrators or electric vibrators talk to your Cleveland Representative, we make both kinds. Complete engineering service for selection and installation offered at no extra charge.

Write today for complete information, including prices.



Dept. C7, 2706 Clinton Ave.
Cleveland 13, Ohio

Check 2958 opposite last page
CHEMICAL PROCESSING

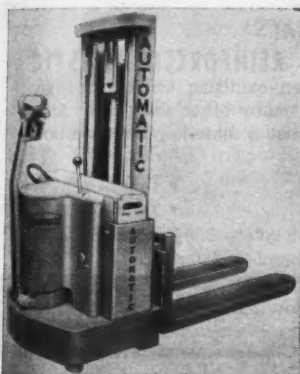
HANDLING & PACKAGING

position on drum, or of plate from one drum to another.

Flexible connections can be fastened to steam lines, hot- or cold-water source, or refrigeration source. Insulated handles are included with units.

(Platecoil drum element is product of Platecoil Division, Tranter Manufacturing, Inc., 735 E. Hazel St., Lansing 9, Michigan.)

Check 2959 opposite last page.

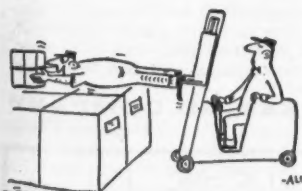


Single or double pallets

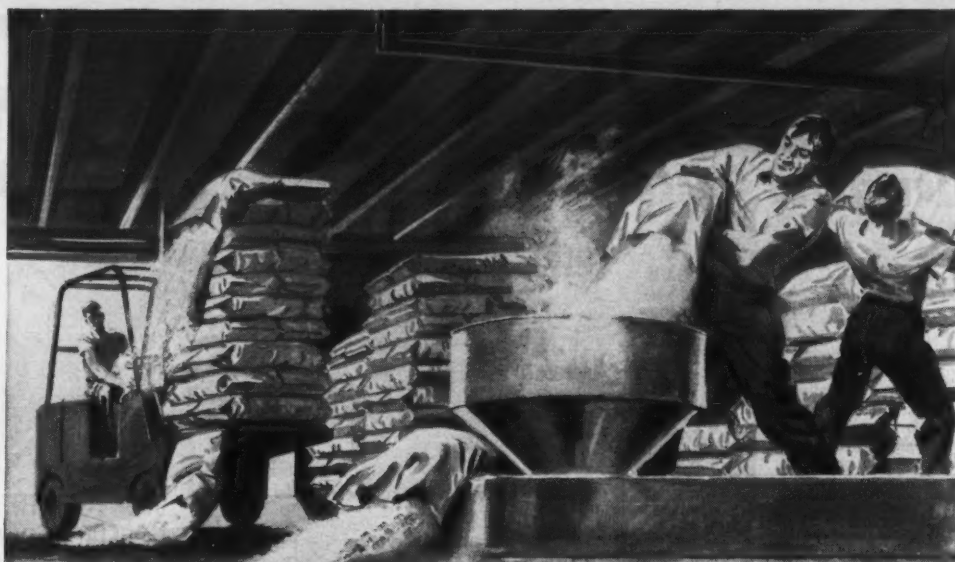
... or skids are handled by fork-lift stacker. Unit is available in 2000-, 4000-, and 6000-lb capacities. Stacker is built in wide variety of fork lengths, widths, and lifting heights.

(Model WOAT fork-over-arm stacker is product of Automatic Transportation Company, Division of Yale & Towne Manufacturing Company, 149 W. 87th St., Chicago 21, Ill.)

Check 2960 opposite last page.



"Okay! Back off! I got it!"



Waste of labor and product is obsolete...



* Lic. under pat. #2862645

Waste of labor, product, floor space, time is now outmoded—eliminate it in your plant today.

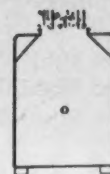
Powell's new Invert-a-bin* Semi-Bulk Handling System has put an end to the biggest headache in handling granular products. These sturdy, easy-to-handle steel or aluminum containers are easy to fill and easy to empty. Weatherproof, they can be stored outdoors freeing indoor storage areas for production.

Ideal for inter-plant or intra-plant these units are considered part of special rail car with "freight free" advantages. Due to the simplicity of design, maintenance of the Invert-a-bin* is nil.

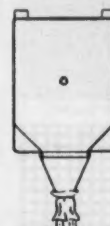
Why continue losing time and money with old style disposable packages when this remarkable new Invert-a-bin* is immediately available on either lease or purchase. Write for literature today!

THE POWELL PRESSED STEEL COMPANY

HUBBARD, OHIO



Fills Fast—22" opening permits fast filling of powdered materials. Internal cone conforms to angle of repose of product.



Empties Clean—Internal cone funnels all materials out of bin. No residue remaining.



Stores Outdoors—Weatherproof, turns yard area into warehouse. Stacks 2 high.



Cuts Shipping Costs—low cost flat-bed equipment considered part of special rail car with "freight free" advantages.

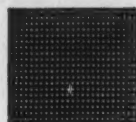


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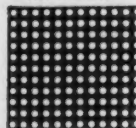
The **Right** PATTERN
The **Right** OPEN AREA
The **Right** MATERIAL

FOR EVERY
SCREENING
REQUIREMENT

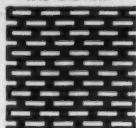
H&K PERFORATED SCREENS



.020" Diameter



.045" Diameter



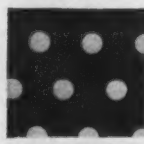
.025" x .125" Slot

For grading, sieving, dewatering, filtering, straining—when you want a screen "just right" for the job—you can depend on H & K.

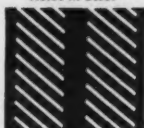
H & K screens are made to your order, with holes accurate and uniform in size, shape and spacing. Burr-free holes are slightly larger at bottom—reduce blinding, save on down time. Margins and unperforated areas are furnished as specified.

Screens are made in practically any material desired... Including plastic. H & K specializes in perforating stainless steel, monel and other corrosion-resistant alloys. Let us work with you on your screening requirements.

Just a few of the many H&K patterns are illustrated



Tapered Round Holes in Steel



No. 3 Diagonal Slot



Listed Under "Perforated Metals"

Write for
H&K
General
Catalog

THE
Harrington & King
PERFORATING CO. INC.

Chicago Office and Warehouse | New York Office and Warehouse
5636 Fillmore St., Chicago 44 | 110 Liberty St., New York, N. Y.

Check 2962 opposite last page



MAGLINER MOBILE LOADING RAMPS

"Before installing our Magliner Mobile Loading Ramp," reports Mr. Leonard Wood, Plant Manager, Witco Chemical Co., "It took 16 to 18 manhours to unload a railcar from ground-level, and four manhours to unload a truck. Three men were required to handle each job. Now, one man and power truck handle a truck shipment in fifteen minutes... a railcar shipment in four hours. We figure our Magliner Loading Ramp paid for itself in six months, besides giving us extra safety for men, loads and equipment, and reducing our lift truck maintenance."

ASK ABOUT THE MAGLINER PROOF POSITIVE PLAN—See a Magliner mobile loading ramp at work, cutting costs right in your own operation.

Now Available! NEW NON-SLIP
GRATING SURFACES FOR SAFE,
SURE TRACTION IN ANY WEATHER

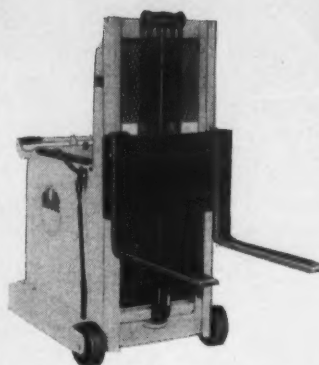
Another Magliner Exclusive!



Write for Bulletin DB-211, Magliner Inc., P.O. Box 237, Pinconning, Mich.

Check 2963 opposite last page

HANDLING & PACKAGING



Counter-balance principle

... is utilized in battery-powered hydraulic lift truck. Lightweight unit is adaptable to any specific weight-lifting problem from 1 to 1000 lb. Weight of lift truck varies according to height of lift, ranging from 745 lb for 54" model to 965 lb for 90" model.

Light weight of vehicle is accommodated for when lifting heavy loads by placing the necessary counter-balancing weight (supplied by user) in special receptacle directly below battery.

Unit can handle double-faced pallets in addition to wire coils, tote pans, rolls, and carboys.

(Counterweight lift truck is product of Big Joe Manufacturing Company, Wisconsin Dells, Wisconsin.)

Check 2964 opposite last page.

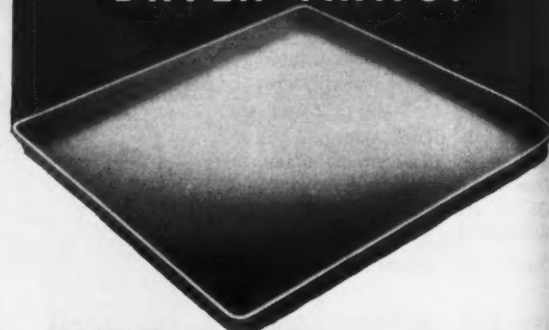
No premelt equipment needed for applying hot melt adhesives

Cleaning downtime is much less with extruder

A hot-melt extrusion system for applying high-molecular-weight adhesives is nearing the commercial stage. Big advantage of the system is that it does not require premelt equipment, thus eliminating a critical source of adhesive degradation (when adhesives are kept molten for a long time before used).

Another advantage is the greatly shortened cleaning downtime. Adhesive that hardens in extruder while it is not being used will quickly

WANT ANTI-CORROSIVE DRYER TRAYS?



USE TOTELINE TRAYS

OF FIBER GLASS REINFORCED PLASTIC

Toteline trays resist non-oxidizing acids, corrosive salts, weak alkalis and many other chemicals. And when Toteline trays resist a material, they are not attacked at all!

- No Maintenance
- Easy to Clean
- Lightweight
- Faster Drying

15 Standard sizes from 8 1/4" to 25 3/8" to 24" x 48".

Write for complete information.

TOTELINE
LINESVILLE, PA.

World's largest producer of fiber glass reinforced plastic trays and toteboxes
Offices in principal cities and Canada

Check 2965 opposite last page

VIBROLATOR®

VIBRATION INDUCERS

"WORLD'S QUIETEST VIBRATOR"

MOVES, SIFTS, COMPACTS MATERIALS

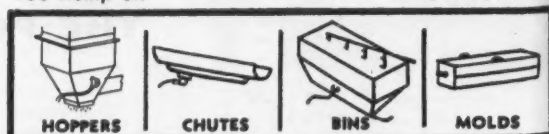
This vibration inducer has only one moving part—a rolling ball. Works perfectly on wet or dirty air. Needs no lubricator. Guaranteed self-starting always. Operates continuously in very hot locations. Absolutely spark-free for hazardous jobs.

The "Vibrolator" vibrator moves material out of hoppers, down chutes and through screens. Compacts concrete in forms or granulars in boxes or drums.

"Vibrolator" vibrators are available in a wide range of sizes "pocket watch" to the most powerful hand-portable unit built. Call your distributor or write for free catalog.

*"Vibrolator" is Martin Engineering's registered trade mark for its vibration inducers and vibration accessories.

MARTIN ENGINEERING COMPANY
155 Kemp St. Neponset, Illinois



Check 2966 opposite last page

CHEMICAL PROCESSING

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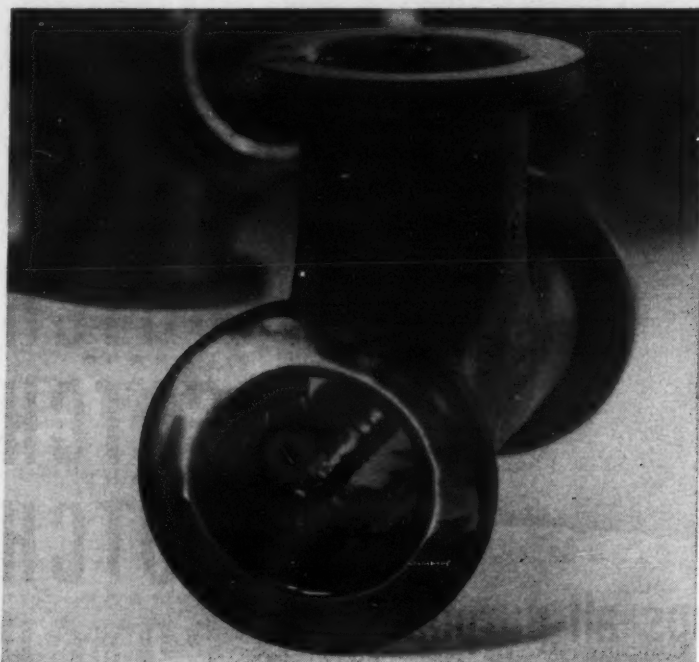
is

G

FLUIDICS

is a Pfaudler Permutit program providing the know-how, the equipment and the experience for solving problems involving fluids

FLUIDICS covers: corrosionneering • water treatment • reactions • waste treatment • fluid analysis • agitation • distillation • blending • metering • piping • heat transfer • centrifuging



NOW IN STOCK

Glassed "ductile iron" fittings* with strength comparable to Glasteel's

Now you can specify glassed-metal fittings with the same confidence buyers have in Glasteel equipment.

New to the Pfaudler line is a series of glassed ductile iron fittings exhibiting physical and chemical properties similar to Glasteel 59's.

High Strength: 60,000 tensile, 45,000 yield and 15% elongation per ASTM-A-395-56T. Other types available on request. Ductile iron, after glassing, is 2½ to 3 times stronger than low-strength gray iron.

Improved Thermal Shock: Far superior to glassed gray iron—now comparable to the thermal shock resistance of Glasteel 59.

Excellent Corrosion Resistance: Resistant to all acids (except hydrofluoric) even at elevated temperatures and pressures, and to most alkaline solutions at moderate temperatures.

Acceptance: Because of its superior strength, ductile iron No. 60-45-15 is widely used in the petroleum industry.

If you've wanted the corrosion resistance and strength of glassed metal but have ruled out gray iron fittings, you'll want to inquire about glassed "ductile iron" fittings from Pfaudler. Write to our Pfaudler Division, Dept. CP-79, Rochester 3, N. Y., for Bulletin No. 977.

*Pat. Pending

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS... the science of fluid processes

Check 2971 opposite last page

HANDLING & PACKAGING

NEXT MONTH

How DeMert & Dougherty speeded cold-filling of aerosols by using a scraped-surface heat exchanger is told in August CP. Efficient, low-hold-up unit makes drastic cut in loss of solvent and formula in between-product flushes.

Build-it-yourself parts make custom conveyor

Custom belt conveyors, assembled by user on the job, can now be quickly set up with standardized, pre-engineered components. Unskilled personnel, using common hand tools, can erect level, inclining, or declining roller-bed belt conveyors of any length—in belt widths of 10, 14, 18, or 22".

Components available include straight intermediate sections, top curves, feeder sections, drives, take-ups, belts, idlers, floor supports, ceiling hangers. Bed rollers can be set high or low. In latter position, conveyor's side frames protect load by serving as guide rails.

Reversible end and center drives can be supplied. Former can be mounted under or at side of conveyor.

(E-Z-Bild components are supplied by The Alvey-Ferguson Company, 3021 Disney St., Cincinnati 9, Ohio.)

Check 2972 opposite last page.

Motor, pneumatic springs use low hp in driving trough of feeder

Rate is easily changed by turning one valve

Uses: Controlled feeding of bulk materials.

Features: Drive assembly is simple; only moving parts are motor and two banks of air springs. It provides fully variable, stepless amplitude control. In standard models, only ½ hp is required to drive troughs up to 24" x 8'. Largest standard size, 60" x 8', uses only 3 hp.

STOP!



COSTLY LEAKS OF VALUABLE FLUIDS

WITH



DURA SEAL

THE ENGINEERED MECHANICAL SEAL

Savings in product alone will repay the cost of Dura Seal installation

For further information, write for free Bulletin No. 480 CP



DURAMETALLIC CORPORATION
KALAMAZOO, MICHIGAN

Check 2973 opposite last page
CHEMICAL PROCESSING

HANDLING & PACKAGING

Description: Drive unit of feeder consists of a 900-rpm, dust-tight AC motor exciter mounted between two banks of heavy-duty industrial air springs. Small, comparatively lightweight offset weights are mounted on each end of motor's double shaft.

Motor, running at constant speed, rotates exciter weights.



Feeder discharging sand under test conditions. Rate is adjusted by one knob while observing pressure gage

These generate concentrated centrifugal force against springs. Stabilizers restrict motor-exciter unit to straight-line, back-and-forth vibrations against the two banks of springs. At natural frequency, these springs amplify force into powerful, uniform vibrations that drive the trough.

Stroke can be during operation by changing pressure in springs. This is done through ordinary air valve and pressure gage. Springs provide about 90% of the force required once vibrating stroke has been pneumatically selected. Capacity is unaffected by head load because spring system automatically increases stroke under load.

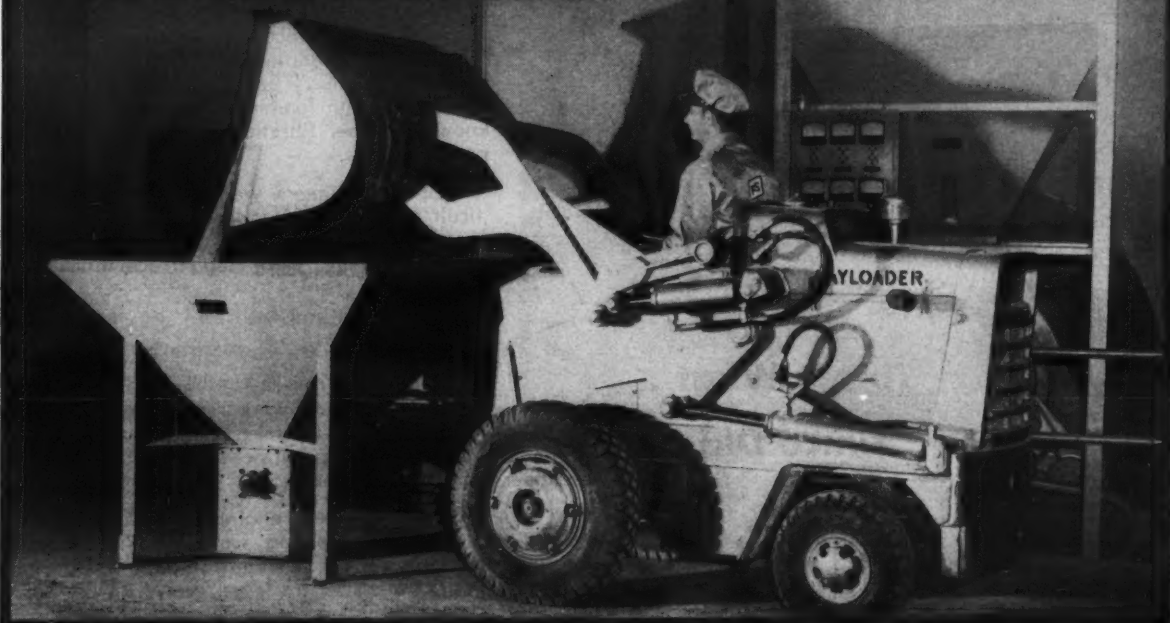
(Amplitrol feeder is being introduced by Carrier Conveyor Corporation, 211 N. Jackson Blvd., Louisville 2, Kentucky.)

Check 2974 opposite last page.

Weighing systems — Eight-page brochure discusses transmitting and processing of weight data. Shows developments for transmitting weights for recording and processing on adding machines, typewriters, tape- or card-punch units, or indicated in illuminated numerical form. Form 2975a — Toledo Scale, Division of Toledo Scale Corp., Toledo 12, O.

Check 2975 opposite last page.

There's a big difference in **PAYLOADER**® performance



Big Load Capacity The model H-25 "PAY-LOADER" tractor-shovel has a carry capacity of 2,500 lbs. — carries more for its weight than any machine in its class.

More Digging Power Breakout force of 4,500 lbs. is available at the bucket cutting edge — more than on any machine near its size. Exclusive power-transfer differential makes traction and "crowding" power more positive, especially when traction conditions are slippery.

More Maneuverable Shortest turning radius (only 6 ft. at rear wheel hub) and power-steer make it possible to operate in closer quarters with greater speed and safety.

Power-shift Transmission The model H-25 is the only machine in its class having a full-reversing power-shift transmission with two speed ranges forward and reverse — the low ranges for digging power and close maneuvering, the high ranges for

fast, economical travel. All "clutching" and gear-shifting is eliminated.

Lower Maintenance The boom and bucket mechanism is of rugged, simple design with fewer parts and linkages. Quality materials are used throughout, including anti-friction bearings at critical pivot points.

Longer Life The most complete system of protection has been engineered into the Model H-25 to insure long life and freedom from trouble: triple air cleaning system for the engine; cartridge-type filters for all three oil systems; self-adjusting, sealed hydraulic brakes; closed, pressure-controlled hydraulic system; grease and oil seals on all pivots and ball joints.

Your Hough Distributor is another reason why you'll get lower-cost-per-ton bulk material handling from a "PAYLOADER". He is ready to give you full information on the H-25, or larger models up to 12,000 lb. carry capacity.

THE FRANK G. HOUGH CO., 744 Sunnyside Ave., Libertyville, Ill.

Send data on H-25 PAYLOADER and Attachments

Name _____ Title _____
Company _____
Street _____
City _____ State _____

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

7-A-1

Check 2976 opposite last page

It was a Filtration Problem

a tough one . . .

A chemical processor wanted to convert a costly batch operation to a continuous filtration process. The slurry being handled was extremely viscous, with foaming tendencies. It was not known whether filtration could be applied on a practical basis.

Eimco engineers went to work on this difficult assignment. A laboratory-size precoat filter was installed on-the-job. Operation was watched, carefully. Results were studied, scientifically, and evaluated.

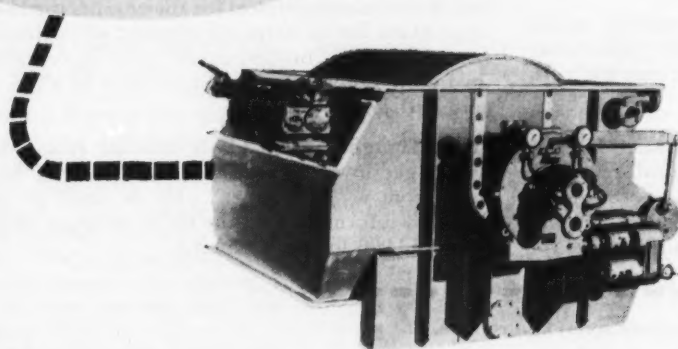
This is What Eimco Did

Equipment modifications were recommended and built into a full-size 8-ft x 12-ft face precoat drum filter. Performance was encouraging, but not as satisfactory as Eimco's engineers knew it could be.

Other adaptations were engineered. Double Hy-Flow valves and extra large piping were installed, to reduce internal resistances. A special drainage deck was designed, for more filtrate outlets. Extra large receivers were built, to offset effects of foaming.

. . . and This was The Result

Performance exceeded expectations, in terms of increased production and greatly reduced processing costs. Five additional custom-built units were installed. The present battery of six precoat filters is almost entirely automatic, one operator being able to control any filter and its auxiliaries from a single control station.



Profitable solutions to difficult filtration problems are the result of Eimco's years of experience in engineering filters for difficult applications. The Eimco representative in your area can give you more facts on Eimco's ability to "fit the filter to your job."

THE EIMCO CORPORATION • SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois

Process Engineers, Inc. Division, San Mateo, California

Export Offices Eimco Building, 51-52 South Street, New York 5, N. Y.

BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD



8-422

Check 2977 opposite last page

HANDLING & PACKAGING

Pneumatic-conveyor gate works under 15 psi

A gate lock that handles 20 tons of material per hour despite 15-lb pressure above the gates will be in pneumatic-conveyor system being installed at Central Fertilizer Co.'s new plant in Montpelier, Idaho. Lock will permit the pressure-type system to move phosphate rock both to and from a surge bin.

Three sets of gates, actuated by master cam, pass material down through lock in successive stages. One set is always closed to keep pressure constant. Upper gate acts as batcher; air-tight lower and middle gates act as seals. All motion in lock is perfectly synchronized.

Air cylinders close gates and hold against downward pressure after predetermined amount of material has been transferred from conveyor-system receiver, through lock and into bin.

(Pressure gate lock was engineered by Dracco Division of Fuller Co., 4063 E. 116th St., Cleveland 5, Ohio.)

Check 2978 opposite last page

Lift truck

. . . of 3000-lb capacity is powered by four-cylinder engine delivering 35 brake horsepower at 2400 rpm and 97-ft-lb torque at 1400 rpm. It is available in either gasoline or LP-fuel models and choice of two transmissions: standard two-speed constant-mesh or optional torque-converter drive.

Travel speed with standard drive is 8 mph forward and reverse; with optional drive, 9.2 both ways. Loaded lifting speed is 55 fpm; lowering speed, 100 fpm. Truck provides stacking height of 131 1/4", has 83" lowered height, and can be turned in 64" radius.

(FTB 30-15 lift truck is development of Engine-Material Handling Division, Allis-Chalmers Manufacturing Co., Milwaukee, Wis.)

Check 2979 opposite last page



PROCESSING EQUIPMENT

Looking more like a file cabinet than the dust collector that it is, cabinet-styled machine (right) removes dust from three separate pressure stations on tablet press

Smartly styled dust collectors installed at Wyeth Labs prove that performance can go hand-in-hand with appearance. Occupying only minimum floor space, the efficient cabinet-type equipment . . .



Assures Smooth Tableting Operations in Drug Plant

Problem: An efficient, compact, and economic method of removing dust emanating from tablet-forming and other pharmaceutical production operations was sought by Wyeth Laboratories, Inc., Philadelphia, Pa. If permitted to exist, dust could contaminate other materials or equipment; annoy and even physically irritate employees, and — in some cases—slow down production.

Typical example of the lat-

ter involved tablet presses which form pharmaceutical tablets from powder. Excess powder, if not removed at forming stations, collected on plungers, causing them to stick and sometimes jam. Press then had to be shut down, cylinder and plunger removed, cleaned, and reassembled before production could proceed.

In multi-station tablet presses, where several colored layers of pharmaceuticals are

added to each tablet, airborne dust particularly presented a contamination threat.

Solution: After a thorough survey, engineers installed compact, cabinet-type dust collectors. Units are attractive in appearance, somewhat resembling an office filing case. Dust is picked up at source by means of a hood and carried through system of short ducts to the collector.

Entering the equipment, dust-laden air passes through series of specially-woven, fine cotton filter bags. Larger particles fall into collecting tray in cabinet's bottom. Remaining dust is trapped on outer, under-side of filters. Cleaned air is discharged back into room, thereby maintaining proper heat or air conditioning balance.

When collector is turned off, most of trapped dust drops immediately into easily removable tray. Remainder can be shaken loose by means of an externally mounted handle.

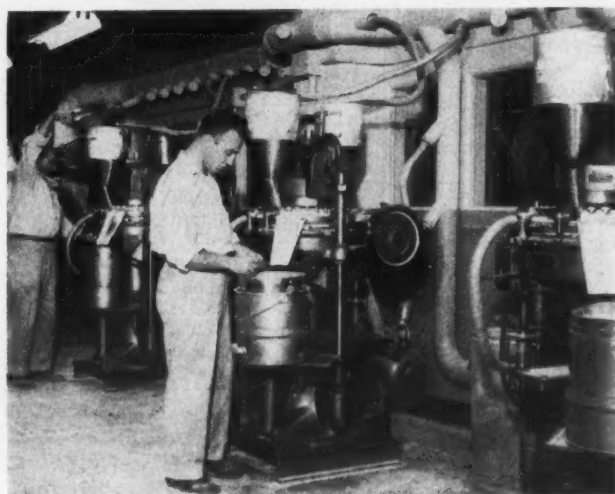
Dust collectors are designed

to serve only a single machine or a small group of machines. Units can be added or subtracted in accordance with requirements of the basic production equipment.

Modified, multi-press, tablet presses at Wyeth required hoods to be placed at each of the three forming stations of the press. In addition, a thin, rectangular nozzle was developed to remove dust at mouth of machine hoppers which are hand-filled. Two-inch flexible metal ducts connect collecting sources to larger header ducts leading directly to dust collector.

Results: Although precise, quantitative measurements of dust control results are difficult to make, Wyeth engineers are satisfied with the collectors' performance. Units installed range in capacity from 160 to 3000 cfm. In some cases, efficiency has been rated at 99.9% (by weight), even when high percentage of dust collected is less than one micron in size.

Dust contamination and interference with multi-press operations has been brought under complete control. Other collector applications in the



Flexibility of dust collection equipment is illustrated by numerous outlets and headers in ductwork leading to these tableting machines. Thin, rectangular nozzles collect dust at top of hoppers

PROCESSING EQUIPMENT

plant include removing dust when loading and unloading powder mixes, at tablet coating pans, at tablet counting machinery, and at tablet bottle-filling operations.

In each case, it is believed that the dust collectors are doing a good job, operating economically, while occupying only minimum amount of floor space. The equipment's smart cabinet-type styling also adds to the neat appearance of the plant.

(Torit unitized dust collectors are product of Torit Mfg. Co., St. Paul, Minnesota.)

Check 2980 opposite last page.

High-speed mixing units feature hydraulic lifts, non-clogging blades

Uses: Mixing, dissolving, and dispersing various materials in chemical and allied industries.

Features: Turbine-bucket type blade performs high-speed mixing without clogging. Optional water-cooled blades are available, if needed. Machines are equipped with 10 to 75 hp drives and have self-contained air-oil hydraulic lift units.

Description: Recently introduced line of high-speed mixing machinery is available in three series. KDZ-100 series has 10, 15, or 20 hp motors with variable speed drive. KDZ-200 models are equipped with 25 through 75 hp drives. Specific designs for top, side, or bottom entry mixing jobs are included in KDZ-300 series.

Middle group can also be fitted with variable speed drive, if desired. Blades are easy to change and are available in sizes ranging up to 28" diameter. Some special blades having 32" diameters have also been produced. All can be furnished with ceramic-tipped buckets, if necessary.

(Kadyzolver mixers are product of Kinetic Dispersion Corporation, 95 Botsford Place, Buffalo 16, N.Y.)

Check 2981 opposite last page.

189, 017

Telegraphic Address
"CITYCE"

Telephone
No. 8679

THE CITY ICE & COLD STORAGE CO.,

12, GENERAL PATTTER'S ROAD,

MOUNT ROAD,

MADRAS, 2

INDIA

18 August 1958.

Messrs. United States Hoffman Machinery Corpn,
Air Appliance Division,
103 Fourth Avenue
New York 3, N.Y.

RECEIVED
AUG 25 1958
INDUSTRIAL EQUIPMENT

Gentlemen:

Subject- Hoffman Centrifugal Blower
with motor-direct coupled
Frame No.4008- Type BBA
Serial No.1878-Size BL 20.

We are in receipt of your kind enquiry dated August 5, 1958 regarding the working condition of the above blower and motor which were purchased by The City Ice & Cold Storage Co., Madras, 2 sometime in 1937. Accordingly we take pleasure to report to you and certify as under:-

1. Ever since the installation in our factory the above blower and motor in 1937, that is for nearly 21 years now, the blower has given us perfect satisfaction without any complaint whatsoever.
2. During this long period of 21 years we never had an occasion to open even a bolt or nut for the purpose of cleaning the machine for the purpose of looking in for any unsatisfactory working.
3. Beyond greasing the bearings regularly once every three months no further attention was ever needed of us; and no repairs, removal or replacement of any single part has been made.
4. The blower has been working all the 24 hours of the day for 9 months in the year, and for the rest 3 months it works 12 hours a day.
5. The blower and the motor (direct coupled) continues to be in the same original form since its installation in 1937 and we have never come across an efficient and long standing blower similar to this anywhere in the market.
6. Last but not the least, we strongly recommend this blower to ice manufacturers all over the world because it is very efficient, long standing and very economical in use.

Regarding the actual pictures of the unit in operation, we shall be attending to this aspect and send you photo copies in due course.

Thanking you for your kind enquiry,

Yours faithfully,

Mariman K. Irani
(Mariman K. Irani)

047

मार्ड ब्लोअर

*without a single repair
and still going strong!* * miles.

In many manufacturing plants, profit margins are dependent on a number of variables. Perhaps the most significant of these is the cost of materials, labor and down-time.

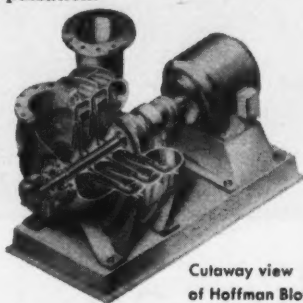
Output up-costs down

Where operating and production schedules depend on the unfailing delivery of clean, dry air or gas at constant pressure, Hoffman Multistage Centrifugal Blowers and Exhausters actually reduce costs, save materials and are free of down-time. For example, the Hoffman Blower pictured here has been in daily use for 22 consecutive years without the need for repairs of any kind. Despite rugged climatic conditions, it runs its regular schedule of 24 hours a day nine months of the year and 12 hours a day the remaining three months. Over the 22 year period, it is estimated that the unit's impellers have traveled the equivalent of 395 trips to the moon and back, a distance of more than 189,017,047 miles.

Efficiency with economy

Economical operation with Hoffman Million Mile Blowers and Exhausters is assured since power is consumed only in proportion to the actual volume of

air or gas handled. The absence of internal wearing surfaces and the lubrication of bearings in outboard mounted housings makes contamination of air or gas impossible. Pressure differential remains constant throughout the range of capacity and air flow is smooth, free of pulsation.



Cutaway view
of Hoffman Blower.

Applications

The many production processes for which Hoffman Blowers and Exhausters provide clean, dry air or gas at constant pressure include:

- air squeegee for continuous liquid removal
- vacuum cleaning

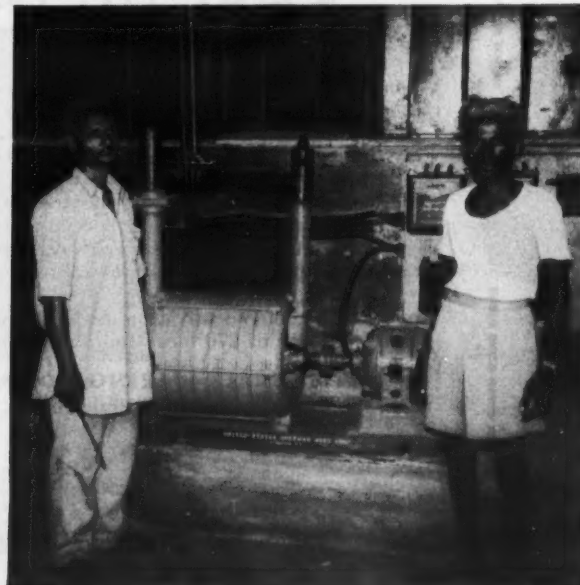
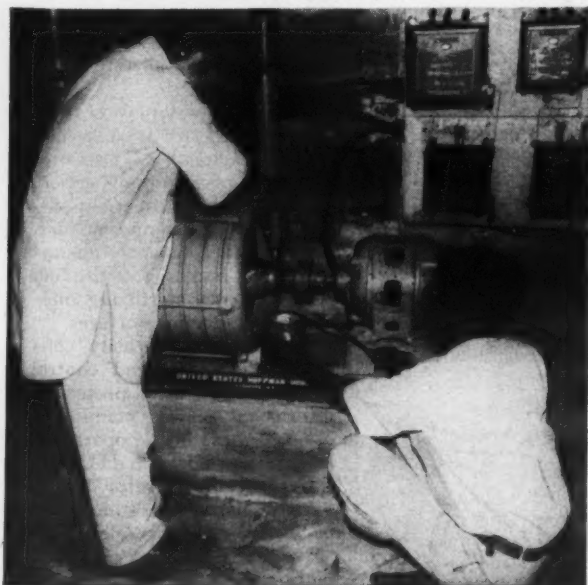
- pneumatic conveying
- continuous drying operations
- agitation of plating solutions
- sewage and industrial waste treatment
- ore flotation
- oxidation of oil and asphalt
- combustion
- glass blowing
- raw water ice plants
- production washing of foods
- circulation of liquids
- gas blowers and boosters
- yarn drying
- wrapping, packing and stacking machines
- ejection of stampings from continuous punching machines

Free service

Hoffman Blowers and Exhausters are available in many standard sizes to meet the toughest service demands. Without cost or obligation, Hoffman engineers will provide objective recommendations on units to help reduce costs and boost profits in your plant. Send now for free brochure AB 104.

U.S. Hoffman Machinery Corp.
Air Appliance Division
103 Fourth Avenue
New York, New York

Occasional greasing was only servicing required in 22 years continuous operation.



Check 2982 opposite last page

PROCESSING EQUIPMENT

**Capacity upped 30-50%,
service life longer
on redesigned mills**

Use 8" diam stones, have
peak peripheral speeds

Uses: Grinding, dispersing
and homogenizing chemicals,
paints, inks, foods.

Features: Larger stone sizes
and higher peripheral speeds
are reported to give mills 30-
50% greater capacity over
previous models. Other im-
provements in design provide
closer control of particle size,
and increased reliability and
longer service life.

Description: Latest addi-
tions to manufacturer's re-
designed line of mills are the
two units, models 800 and
2800. Both machines have 8"
diam carborundum stones.
Peripheral speed on model
800 at 3600 rpm (motor op-
erating on 60 cycle) is 7550
fpm. Mill is equipped with 25
hp motor. Model 2800 has
peripheral speed of 11,350
fpm at 5400 rpm. It is fitted
with 50 hp motor.

Spindle assembly is 1 3/4"
larger than assemblies pre-
viously available. Device seats
on tapered spline on shaft re-
sulting in more positive
alignment. Top bearing has
full uninterrupted seat and
82% higher thrust rating over
former bearings used.

Stone plate, which carries
rotating stone, has redesigned
labyrinths, including tapered
surfaces. Plate uses screw ef-
fect to wind materials out of
labyrinths. This minimizes
possibility of contaminants
getting into bearings below.
Assembly is further protected
from contaminants by O-
rings and grease seals which
keep foreign materials out
and grease in.

To stop destructive vibra-
tion a Collet-type locking de-
vice is used. This locks as-
sembly firmly, reducing cost-
ly wear and noise during op-
eration.

(Further information about
models 800 and 2800 More-
house mills can be obtained
from Morehouse-Cowles, Inc.,
1150 Fernando Road, Los An-
geles 65, California.)

Check 2983 opposite last page.

THE YARWAY FAMILY OF FINE STEAM TRAPS



SERIES 60—normal needs, pressures to 400 psi, 6 sizes. SERIES 120—normal needs, pressures to 600 psi, 6 sizes. SERIES 40—for extra heavy loads, 5 sizes. NO. 30—for extra light loads ($\frac{1}{2}$ " only). INTEGRAL STRAINER—highest pressures and marine use, 6 sizes.



NEW NO. 30 IS A LIGHT LOAD SPECIALIST

When the condensate load in your steam lines is *extra light*—this new Yarway $\frac{1}{2}$ " No. 30 Steam Trap is *exactly right*.

Specify it. You'll experience new *economy of operation* with the *tighter shut-off*. Operation is *quieter* due to lever action. *Maintenance is less*—because of the replaceable valve-seat assembly, only one moving part and stainless steel construction. Enjoy these special features plus all the regular advantages of famous Yarway Impulse Traps such as *quick heating*, even temperatures, *small size*, good for all pressures, *non-freezing*.

Over 1,250,000 Yarway Impulse Traps already sold; buy yours from one of 270 local Industrial Distributors.

YARNALL-WARING COMPANY
125 Mermaid Ave., Philadelphia 18, Pa.

YARWAY impulse® steam traps

Check 2984 opposite last page

PROCESSING EQUIPMENT

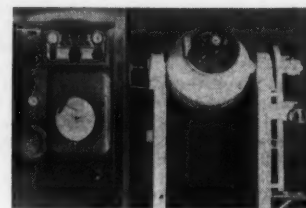
**Drys, blends, sterilizes
either individually,
or in combination**

Dryer-blender equipped with
gas-sterilizing system

Uses: Drying, blending, and sterilizing powders and bulk materials that are heat and moisture sensitive.

Features: Equipment can dry, blend, or sterilize individually or in combination, automatically, in one single unit. Operations are conducted in minimum time, and under safe, accurately-controlled conditions. Inerted ethylene oxide is used as sterilizing agent.

Description: Equipment consists of a glassed-steel conical dryer-blender which is integrally combined with gas-sterilization system. Interior surfaces of dryer-blender re-



All operations in dryer-blender-sterilizer are controlled from single control panel

sist all acids except hydrofluoric, even at elevated temperatures. It is also resistant to most alkalis at moderate temperatures.

Controlled rotation of unit coupled with double-cone shape of chamber, promotes complete, even mixing action. Material is continuously deflected towards center of unit, resulting in constantly changing cross-section of product presented to sterilizing medium and drying surfaces.

Operations are easily controlled from unitized control console. System of protective interlocks assures completion of each phase of the operation. If substandard conditions should occur, monitor immediately halts operation until conditions are corrected.

Materials being processed can be quickly loaded and unloaded through fast-closing

PROCESSING EQUIPMENT

autoclave door. Door closes instantly against Teflon gasket. Equipment is available in sizes ranging from two to eight feet in diameter.

(Dryer-blender-sterilizer is joint development of Wilmot Castle and the Pfaudler Co., a division of Pfaudler Permutit, Inc. Further information may be obtained from Wilmot Castle Co., Box 629, Rochester 2, New York.)

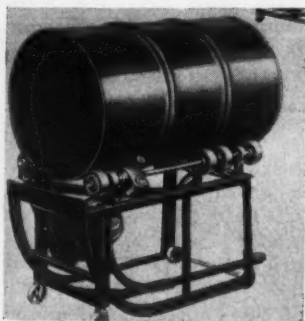
Check 2985 opposite last page.

Loads up to 500 lb handled by redesigned drum rotator

Uses: Mixing drum contents up to 500 lbs in either 55 or 30 gal drums.

Features: Mobile drum agitator has been redesigned to give greater rigidity and to prevent denting of light-gage drums. Nose piece has been reinforced with heavy steel section for greater safety and stability.

Description: Drum rotator has been strengthened by addition of two horizontal channel sections. Designed for either production mixing or experimental work, unit comes complete with standard 1/2 hp motor, switch, and cord.

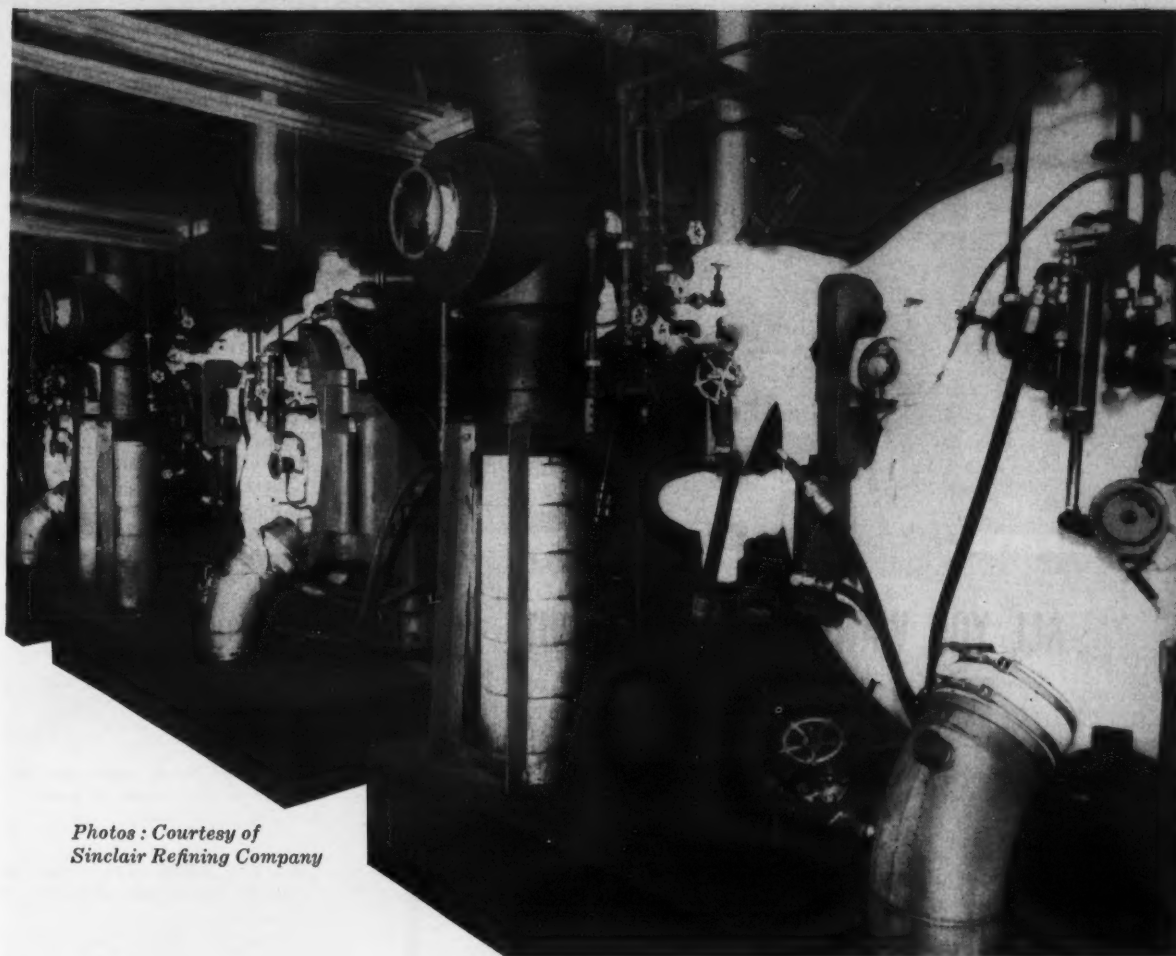


Drum rotator permits mixing contents of drum while inside container

Special size motors are also available. Attachments can be furnished to handle five-gal and one-gal containers.

(#500 Rotator is product of Morse Manufacturing Co., Inc., 727 W. Manlius St., E. Syracuse, New York.)

Check 2986 opposite last page.



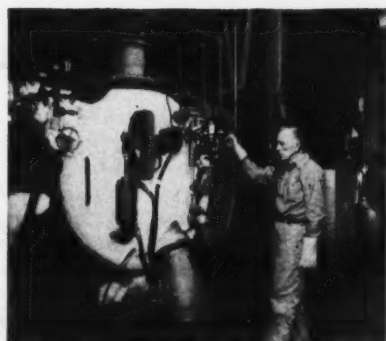
Photos: Courtesy of
Sinclair Refining Company

LOW TEMPERATURE PETROCHEMICAL OPERATION

One of the numerous difficult deliquification problems for which the Sharples Super-D-Hydrator was designed . . . the special job, involving extremely low temperature, fine hydrocarbon "crystals" . . . desired purity of product requiring high centrifugal force, and continuous high production.

The battery of Sharples C-41 Super-D-Hydrators illustrated above is in operation at one of the plants of Sinclair Refining Company.

The C-41 Super-D-Hydrator—Another Sharples Exclusive



THE SHARPLES CORPORATION
Centrifugal and Process Engineers
2300 WESTMORELAND STREET / PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • HOUSTON • SAN FRANCISCO • LOS ANGELES • ST. LOUIS • ATLANTA
Associated Companies and Representatives throughout the World

Check 2987 opposite last page



ALL YOU WANT TO KNOW ABOUT PUMPS for corrosive and slurry service

Complete engineering data — dimensions, performance curves, parts lists and specifications on the entire Dorr-Oliver line of alloy metal, lined and diaphragm-type pumps — *all in one big bulletin!* Here's everything you need to solve difficult pumping problems . . . just off the press!

Write for your copy now, or contact the fully qualified Dorr-Oliver representatives and distributors listed below.

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Equipment Engineers Inc.
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Tel.: Trinity 7-2539

John J. Round Company
25 Wing Rd., Lynnfield Center, Mass.
Tel.: Lynnfield 4-4950

Chemical Pump & Equip. Corp.
75 West St., New York 6, New York
Tel.: BO 9-7544

The Cunningham Company
101 Investment Bldg., Pittsburgh, Pa.
Tel.: Court 1-7092

Chemical Pump & Equip. Corp.
3537 Lee Road, Cleveland, Ohio
Tel.: Longacre 1-3025

Chemical Pump & Equip. Corp.
565 West Washington Blvd., Chicago, Ill.
Tel.: ANdover 3-1881

Chemical Pump & Equip. Corp.
1717 Section Road, Cincinnati, Ohio
Tel.: ELMhurst 1-5765

Shutt Process Equipment Corp.
5627 Manchester Ave., St. Louis, Mo.
Tel.: Mission 7-0908

Simonds Machinery Company
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Tel.: DOuglas 2-6794

Kerr Machinery Company
Kerr Bldg., Corner of Ft. and Beaubien Sts.
Detroit, Michigan
Tel.: Woodward 1-0590

The Galigher Company
545 W. 8th South St., Salt Lake City, Utah
Tel.: Elgin 9-8731

The O'Neill Pump & Engineering Co.
601 E. Franklin St., Richmond, Va.
Tel.: Milton 4-4828

R. V. Gildersleeve Company
P. O. 2623, Baton Rouge, La.
Tel.: Dickens 3-2338

Rittelmeyer & Company Inc.
150 Nassau Street N.W., Atlanta 1, Ga.
Tel.: Jackson 4-1531

Brown & Morrison
207 Liberty Life Bldg., Charlotte 2, N. C.
Tel.: Ed 3-0774

M. N. Dannenbaum Company
P. O. 14496, Houston 21, Texas
Tel.: Walnut 3-7655

Paco Engineering Company
6578 Broadway, Alden, New York
Tel.: Regent 3526 (Buffalo)

Simonds Pump Company
455 East 4th St., Los Angeles, Calif.
Tel.: MUTual 8321



Check 2988 opposite last page

PROCESSING EQUIPMENT

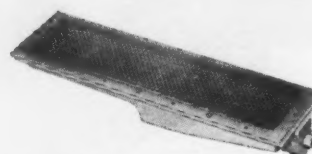
**Infrared heater-generator
uses natural, propane,
or manufactured gas**

Grid temperature modulates
between 900 to 1800°F

Uses: Processing applications anywhere in industry where heat is required at temperatures which do not exceed 1000°F.

Features: Infrared heater operates on either natural, propane, or manufactured gas, as well as vaporized gasoline.

Description: Basic principle of infrared gas heater-generator is that it projects rays through air without heating



Efficient infrared heater can be
used in wide variety of applica-
tions

the air. When rays strike an opaque object, the object itself is heated.

Unit is entirely an atmospheric type of device. Design consists essentially of a metallic burner having a stove iron casting as body and an Inconel wire grid screen. There are no ceramic parts.

Grid temperature modulates between 900 to 1800°F without change in orifice. At 1800°F, range of infrared emissivity is between 1.5 and 5 microns in length.

As an example of the device's performance, units could be installed on ceiling of a 40' room and objects on floor would be comfortably warm without unnecessary heating of all of air between ceiling and floor.

(Infrared heaters are product of Infra Red Division of Van Dorn Iron Works Co., 2685 East 79th Street, Cleveland 4, Ohio.)

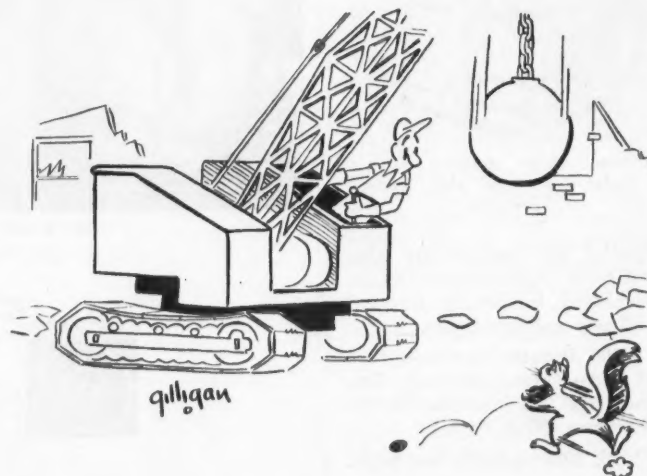
Check 2989 opposite last page.

**Electronic air cleaner
capable of handling
1000-240,000 cfm**

Uses: Removing dust particles from air streams.

Features: High-velocity electronic air cleaner can handle from 1000 to 240,000 cfm. Collection efficiency is as high as 97%. Unit is shallower, smaller in face area, and requires less space than conventional precipitators.

Description: Precipitator is designed to accommodate highest face velocities experienced in heating and cooling coils while providing maximum discoloration efficiency.



PROCESSING EQUIPMENT

Individual collector cells save space and reduce installation costs, being smaller for a given air volume.

Collector cells are of all-aluminum construction. They are available in 16 and 20" heights and widths of two and three feet. Fact that collector



High-velocity electronic air cleaner requires only minimum power

plates are shorter in direction of air flow than conventional units makes it easier to wash away precipitated dirt.

Collector plate assembly consists of alternately grounded and charged aluminum plates. A strong electrostatic field is set up between the plates by 4000 volts DC applied to insulated plates. Upon entering this field, charged dust particles are repelled by plates of same polarity and attracted to plates of opposite polarity. As these particles are precipitated onto plates they are held there by a viscous adhesive coating.

All ionizer and plate insulators are located outside of air stream. Ionizing wires extend full height of collector cell, resulting in more effective ionization. Precipitator is designed for easy replacement of individual plates. Any one cell can be removed without disturbing other cells. Units are also available in high-velocity, wide-space plate design for heavy industrial service.

(Electro-cell electronic air cleaner is a product of American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Kentucky.)

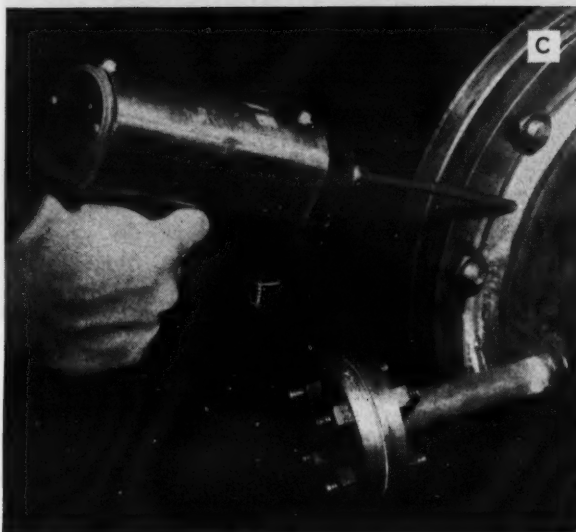
Check 2990 opposite last page.



A



B



C



D

Modern techniques bring new benefits

Whatever is new in metallurgy, welding, or testing is sure to absorb the attention of Downingtown experts—especially when it helps us produce better processing equipment for you. Here are some of the modern techniques you would see on a trip through our shop. Write for handy index to the ASME Code.

A Skin-deep—When paint thickness is vital to product protection against corrosion, this instrument tells us exactly how thick the paint application is.

C Sniff! Sniff!—No leaks here...if there were, the Halide leak detector would react fast as it sniffs the seams and joints of a vessel pressurized with gas.

B Fresh from the oven—Heated to 250°F to drive out water vapor, these welding electrodes won't contaminate weld metal or adjacent plate with water-released hydrogen.

D A penetrating analysis—Special dye, sprayed on weld after back-chipping, reveals microscopic cracks so they can be eliminated before weld is completed.

Downingtown Iron Works, Inc.

144 Wallace Ave., Downingtown, Pennsylvania

division of **PRESSED STEEL TANK COMPANY** Milwaukee

Branch offices in principal cities

**HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION
CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS**



Check 2991 opposite last page



Each dominates its field— IT'S THE TEETH THAT MAKE THE BIG DIFFERENCE!

With the Cowles Dissolver this is because the unique teeth of the patented Cowles impeller produce the most efficient mixing and dispersing action yet developed. The advanced engineering of the Cowles variable speed power transmission system makes it easy to apply the correct speed during each mixing phase—**provides for positive, automatic delivery of the power required at the time required.** This assures the operator control in all dispersing stages, whether viscosities are greatest at start, mid-point or finish. These exclusive advantages are some of the reasons why Cowles Dissolvers can handle larger batches of most difficult materials in less time than any other equipment.

Imitated but never equalled, Cowles Dissolvers are most in demand for high speed mixing, ultimate dispersion, dissolving, emulsifying and deagglomerating in processing solid-liquid, liquid-liquid and gas-liquid materials. Production rates are up to 20 times faster than ordinary equipment. Viscosities in excess of 50,000 centipoises are easily handled. There is no surge or splash. You'll save an operators' cleanup time...the **self-cleaning impeller won't clog.**

Cowles engineers will assist you in adapting the Cowles to your materials, processes and present equipment. They can help solve your processing problems economically.

Let us prove it in your plant...at our risk.

MOREHOUSE COWLES Write today for complete information and catalog.
MOREHOUSE-COWLES, INC.

1150 San Fernando Road, Los Angeles, California

5508

Representatives in principal cities • Convenient lease and time payment plans.

SEE HOW THE COWLES IS SOLVING THESE PROBLEMS: (Cases from Cowles APPLICATIONS ENGINEERING files)

Paraffin wax time cut 50%
The desirable polyethylene blends, with the tough bright coating, are now made in Cowles under-drive 100-500 gal. tank models with heated jacket and manhole opening in the top. Batches completed in less than half previous time.

Powdered lead mixed 70 lbs. per gal.!
Powdered metallic lead is being thoroughly dispersed in batches of 700 lbs. to 10 gals. of mineral spirits...in a few minutes! No recourse to time-consuming ball mill. Great saving in space, too, and probably a record in lbs.-per-gal. dispersion.

Mastic compounds in minutes
High viscosity mastic compounds that used to take hours via old "Z" blade methods, are now prepared in minutes with the Cowles. The Cowles deliv-

ers maximum horsepower at all impeller speeds.

Paper coatings are more stable

Nitrocellulose paper coatings are made simply by adding the nitrocellulose cotton to the diluent in the tank, pausing for a brief soak-wet down period, then adding the active solvent while the Cowles is in motion. Result: an excellent, highly stabilized solution without the problems of drifting viscosities. In operation, there's no surge, no splash.

Pipe and joint compounds speeded

Grease pipe and joint compounds that formerly took hours when mixed by "Z" blade are now being made in minutes with the Cowles. The Cowles "hydraulic attrition" action speeds many processes to an astounding degree.

PROCESSING EQUIPMENT

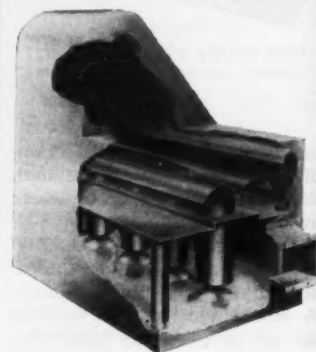
Hydrostatic dust collector has wide application, boasts peak efficiency

Can even separate floating dust particles

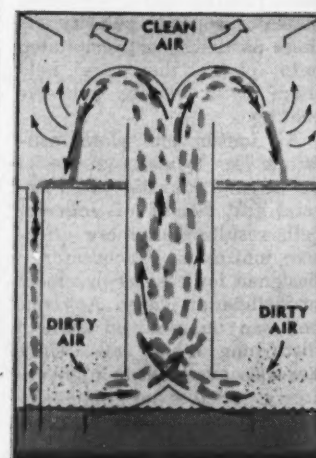
Uses: Removing dust and fumes from air and gas streams.

Features: Dust collector's effective design and principle of operation assures top collection efficiency, even under difficult conditions.

Description: Wet-type dust collector uses circular venturi to introduce and mix dirty gas and water mist into vertical-tube cleaning element. Number of components needed are determined by



Curved baffles above tubes in dust collector act as efficient dust impingement surface



Wet-type dust collector uses circular venturi (bottom) to introduce and mix dirty gas and water mist into cleaning tube. After passing through tube, water is removed by curved baffle above tube

Check 2992 opposite last page

PROCESSING EQUIPMENT

particular wet-collection application.

Tubes are designed to permit optimum retention time of dust in water. Water is removed from air stream by circular baffles located above tubes. Baffles also act as efficient dust impingement surface. Operation is such, that even floating dust particles can be removed.

Separated material may be discarded from collection hoppers by either manual or continuous methods. Depending upon particular application, dust collector's components can be made of steel, ceramics, or other corrosion-resistant materials.

(Mist-O-Miser Dustractor is development of Fly Ash Arrestor Corporation, 275 North First St., Birmingham 1, Ala.)

Check 2993 opposite last page.

**Temperatures up to 400°F
withstood by synthetic
non-woven felt**

Uses: As filter medium for various liquids, oils, and gases.

Features: Synthetic fiber non-woven felt is chemically stable at temperatures as high as 400°F. Material is resistant to most acids and alkalis.

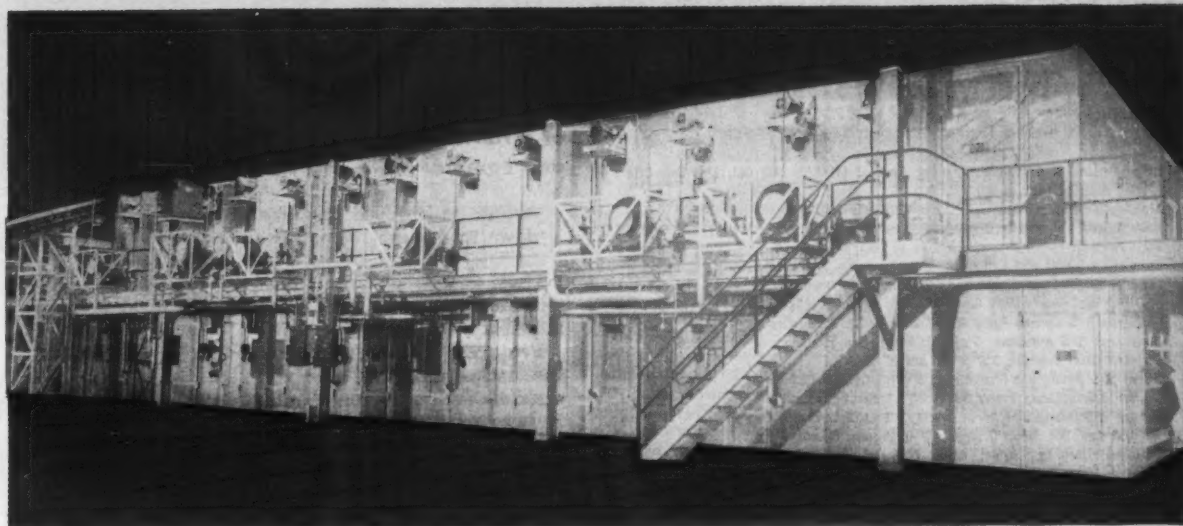
Description: Product can be made from Dacron, Orlon, and other fibers. Depending upon fiber from which it is made, finished material has strength up to 1500 psi. Material is not effected by moisture and will not support rot, mildew.

Product is uniformly smooth and possesses the flexibility of all felts. It can be easily die cut and will not become ragged at the edges. It is also readily sewn.

Principle that gives product its advantageous characteristics is mechanical interlocking of fibers, rather than use of a chemical binding agent or supporting fabric. The material is available in commercial quantities and wide variety of widths.

(Troyfelt is a development of Troy Blanket Mills, New York, New York.)

Check 2994 opposite last page.



THE GENERAL TIRE & RUBBER COMPANY *Has Installed Three of These* **"NATIONAL" MULTIPLE CONVEYOR DRYERS** **FOR SYNTHETIC RUBBER CRUMB**

Successful operation of the first, then the second of these large, high-speed dryers inevitably resulted in this third "NATIONAL" installation as demand for the company's product increased.

Through unique principles of design and construction, and exclusive features of operation and control, these "National" dryers provide greatly accelerated production and consistently high uniformity in the drying of this difficult-to-handle material.

Write for Literature Describing these Modern Dryers

THE NATIONAL DRYING MACHINERY COMPANY
LEHIGH AVE. and HANCOCK ST., PHILADELPHIA 33, PA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass.
Cable Address: "NADRYMA"—W. U. Code

Check 2995 opposite last page

RENT or BUY CHEMICAL EQUIPMENT from your FIRST source

Choice Selection from Our Stock!

Baker Perkins & Cavanaugh Stainless Jacketed MIXERS 300 Gal. 150 Gal. Other sizes down to Lab. 1/4 gal.

Stainless Conical Blender; 22 cu. ft.; 42"x16"; 16" cones
NEW Falcon Dbl. Ribbon Blenders; S/S or Mild Steel
Stainless Heat Exchangers; all sizes up to 1000 sq. ft.
Stainless A.T.&M. 60" Centrifugals; Susp.; Vapor (Tite)
Pfaunder Stainless or Glass Lined Evaporators; 6' Diameter
Stainless Vac. Reactor 950 Gal.; 60"x76"; manhole in head
Mojonnier S/S Vacuum Pans; 3'x10' and 6'x12'; accessories
Blaw Knox S/S Autoclave; 5'x10'; Jacketed, Coll Heated
Stainless Steel Columns; 15" x 15' and 8" x 10'
Hersey S/S Rotary Gas Fired Dryer; 5'x26'; Counter Current
Louisville S/S Rotary Dryer; 30" x 28'; Indirect fired
Proctor & Schwartz S/S Apron Dryers; 5 Section; 34' long
Bufflovak Lab. Dbl. Drum Dryer 6'x8" in Vacuum Housing
Stainless Filters by Sparkler, Alcoa, Enzinger, others
Stainless Filter Presses by Shriver & Sperry; 12" & 30"
A. O. Smith S/S Lined Pressure Tanks; 11,000 gal; 10'x18'7"
Abbe, Patterson, International Pebble Mills up to 8' x 8'
Mikro Pulverizers all sizes; some in Stainless;
Fitzpatrick Comminutors in S/S; Models D, K7 and C
Stainless Colloid Mills and Homogenizers; standard makes
Stainless Steel Closed Vertical Kettles; 850 & 1300 Gal.
DeLaval Industrial Centrifuges and Hermetic Separators
Sharples C27 D-Hydrator in Type 316 Stainless; 40 HP
Heavy Gauge Stainless Hor. Tanks; 6'x34'; 7000 Gal.

FMC PAYS MORE for YOUR SURPLUS EQUIPMENT

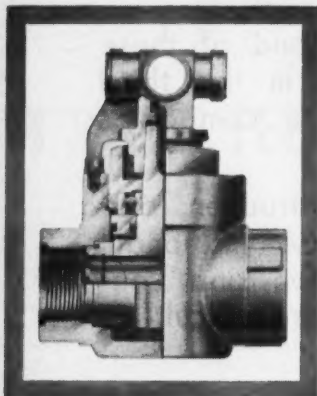
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GRAHAM..
THE PLUG
VALVE
THAT
NEVER
NEEDS
LUBRICATION

Graham Non-Lubricated Round Port Plug Valves are maintenance-free... immune to the weaknesses and failures prevalent in valves requiring lubrication.

Free floating, self-aligning seats... an extreme minimum of plug-body contact, plus bronze or ball thrust bearing plug hold down arrangement assure optimum operating ease under full-rated pressure.

Polished, micro-fitted seats assure bubble tight sealing.

Graham Non-Lubricated Plug Valves, available in sizes 1" through 4" and working pressures to 10,000 psi give outstanding, trouble-free service in drilling, producing, processing and transmission operations of the oil and gas industry. Write for Graham Valve Catalog No. 581 GF before specifying any valves.

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TEXSTEAM Corporation
320 HUGHES ST. • P. O. BOX 9127 HOUSTON 11, TEXAS • PHONE WA 8-8853

Check 2997 opposite last page

PROCESSING EQUIPMENT

Unit combines advantages
of a roll crusher
and hammer mill

Adjusts to produce any size
down to 6 mesh

Uses: Crushing various ma-
terials in chemical and allied
industries.

Features: Machine combines
the advantages of a roll
crusher and a hammer mill.
Unit can be adjusted to pro-
duce any size down to 6 mesh
when used in close circuit.

Description: Principle of
operation vastly reduces pow-
er consumption needed with
conventional equipment. Ham-
mer and roll are independen-
tly driven at different speeds.
Unit can crush practically any
material with minimum of
undesirable fines. Machine is
particularly adaptable for use



Crusher is actually two machines
in one — combining advantages
of a roll crusher and hammer
mill

with materials that have a
tendency to build up.

Large 24" mill can process
over 40 tph. Hammers are de-
signed to give long life and
require only minimum main-
tenance. Machine can be fur-
nisher rubber-lined, if de-
sired.

(Rollhammer is product of
O'Brien Industrial Equipment
Company, 1569 Hudson Ave-
nue, San Francisco 24, Calif.)

Check 2998 opposite last page.

Dryer data

The rotary dryers described
in the Formica flakeboard
story in the April issue of
CHEMICAL PROCESSING (pages
90-93) were Ruggles-Coles
units supplied by Hardinge
Company, Incorporated, 240
Arch Street, York, Pa.



HERE'S THE MOST COMPLETE NOZZLE CATALOG EVER PUBLISHED

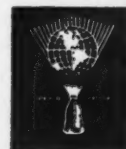
Whatever your nozzle problem, look first in this new
catalog by Spraco. Here is complete information on
a wide range of nozzle types and sizes as well as
general spraying coverage data.

Send for your **FREE** copy today...

SPRAY
Engineering Company

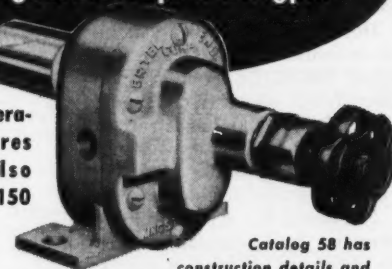
105 Cambridge Street, Burlington, Mass.

Check 2999 opposite last page



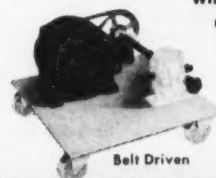
**ERTEL Stainless Steel
Self Priming PUMPS have Plastic
Spur gears...cap. 3-50 gpm**

Standard opera-
ting pressures
3-50 psi; also
available to 150
psi.



Catalog 58 has
construction details and
capacity charts. Write for it today.

With or without
motor and
base.



Belt Driven

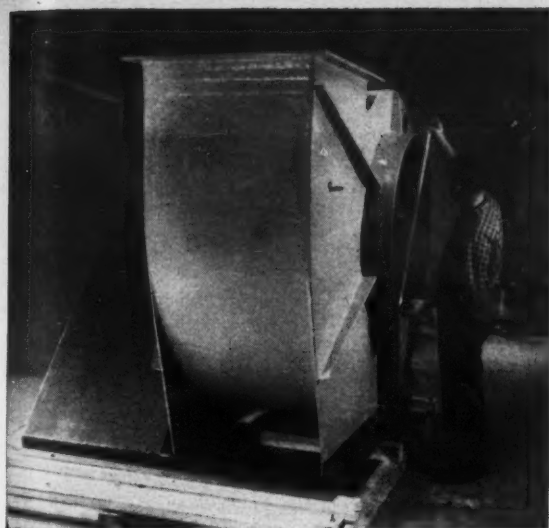


Direct
Drive

ERTEL
ERTEL ENGINEERING CORPORATION
Liquid Handling Equipment Manufacturers Since 1932
KINGSTON 3 NEW YORK

Check 3000 opposite last page

CHEMICAL PROCESSING



Cut Maintenance and Replacement Costs of Handling Corrosive Fumes; Specify



SOLID PLASTIC FANS

— NOTHING TO RUST —

Extremely wide range of standard sizes including both centrifugal and axial designs, fabricated of our proven, corrosion-free Rigidvin (rigid vinyl) and Rigidon (reinforced plastic) construction, speeds delivery and minimizes engineering costs.

Let the Heil corrosion engineers, with more than 29 years of successful experience designing and fabricating corrosion resistant equipment, help you select the size and type of plastic fan that will give you the best service under your particular corrosion conditions.

Ask us also about Heil solid plastic Corrosion Resistant Collecting Hoods, Air Ejectors, Ducts, Stacks, Fume Scrubbers and Tanks for a completely corrosion resistant, rust-free, low maintenance ventilating system.

Write for the Heil fully descriptive bulletins. They list standard sizes and give complete specifications.

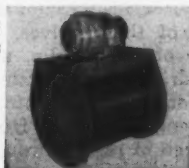


HEIL PROCESS EQUIPMENT CORPORATION

12901 Elmwood Avenue • Cleveland 11, Ohio



Heil Rigidvin (Rigid Vinyl) Solid Plastic Centrifugal Fan.



Heil Rigidon (Reinforced Plastic) Axial Fan.

Check 3001 opposite last page

PROCESSING EQUIPMENT

High vacuum stills operate continuously, process 2 tons/hr

Costs less than 0.1 cents per lb to run

Uses: Separating organic and silicone compounds in molecular weight range from 250 to 4000.

Features: Stills can operate on a continuous basis, with hourly throughput capacities ranging from 400 to 4000 lbs. Operating costs per lb of material processed vary from 0.06 to 0.1 cent.

Description: High-vacuum stills function virtually unattended once feed flow has been established. Operating and maintenance costs are low. Unit has only one moving part, which is a rotor revolving at speeds up to 425



Centrifugal molecular still can handle large production volumes, permits boiling points to be lowered 100 to 400°F

rpm maximum. Manufacturer reports that in more than a year of on-the-job operation of some dozen and a half units, shut-down has consisted of only occasional or regularly scheduled cleaning.

Only laboratory and pilot plant models of these centrifugal molecular stills have been available in the past. Typical materials that can be processed include fatty acids, waxes, vegetable oils, epoxy resins, petroleum greases, tall oil, and pharmaceuticals.

(Further information about high-vacuum stills may be obtained from Consolidated Electrodynamics Corporation, Rochester Division, 1775 Mt. Read Blvd., Rochester 3, New York.)

Check 3002 opposite last page.

BURGESS-MANNING

SNUBBER NEWS

Dedicated to the Elimination of Pulsation and Intake and Exhaust Noise

Flue Gas Silencer at the Premier Oil and Refining Company, Fort Worth, Texas

In recent years most of the veil has been removed from the mystery surrounding the theory and practical approaches to industrial noise control. Even so, there exists today an increasing challenge in this field.

High-level industrial noises may have a deafening or harmful effect on employees or residents in the immediate area where the intensity is great—still, only the morale and efficiency of the workman may be affected. Of major concern are noises from high speed blowers, compressors, vent gas systems, gas, diesel, and steam engine exhausts and intakes, especially when located in a populated area.

During the 25 years that the Burgess-Manning Company has been specializing in the elimination of industrial noises, their engineers have pioneered many new principles of noise suppression. One such accomplishment is the development of a dynamically reacting silencer which subdues the abounding noise energy created in venting high temperature erosive flue gases from the regenerator of a cat-cracker.

Today there are scores of Burgess-Manning Flue Gas Silencers installed in refineries over the world. They have built a perfect record of performance and durability.

One such location is the Premier Oil and Refining Company of Fort Worth, Texas, where a Burgess-Manning Flue Gas Silencer has been in continuous service for more than four years.

Company officials there justly concerned with the desirability of good employee and community relations recognized this problem from the beginning of operation. Burgess-Manning engineers were called in to analyze the extent of their noise problem. A special high temperature, erosive-resistant silencer was recommended and subsequently installed near the top of the regenerator stack on the flue gas vent.

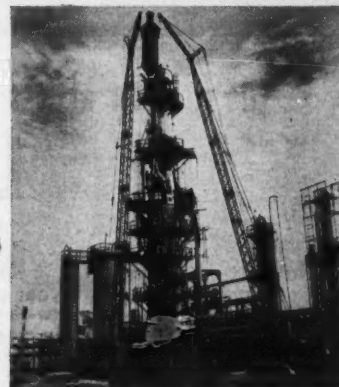
The noise level from the unsilenced flue gas averaged 94 db in the adjacent area. After installation of the silencer, this level was reduced to approximately 78 db (a 95 per cent reduction in noise energy), just about the level of the normal refinery background noise.

Operational Features Burgess-Manning Flue Gas Silencers

1. Reduces flue gas vent noises to approximately background levels.
2. Erosion Resistant.
3. Self supporting, ruggedly designed for continuous trouble-free service.



TYPICAL BURGESS-MANNING SNUBBER



Burgess-Manning Snubber being installed on the flue gas vent of the catalyst regenerator at the Premier Oil and Refining Co. Plant, Fort Worth, Texas.

SEND US a brief outline of your pulsation or exhaust noise problems and we will gladly send you pertinent literature.



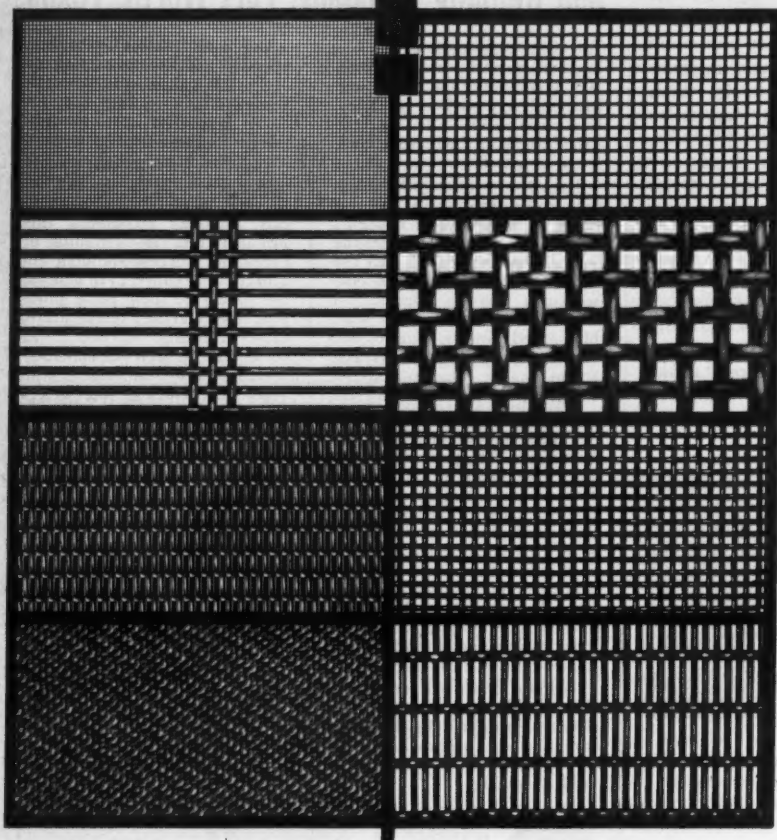
BURGESS-MANNING COMPANY

Sound Engineering Industrial Silencer Division
9231 Sovereign Row, Dallas, Texas
Libertyville, Illinois

Check 3003 opposite last page

Do you have a
filtering, straining
or sizing operation

Do you make a
product for sizing,
filtering, straining



Do it better at less cost with . . .

Ludlow-Saylor

WIRE CLOTH & SCREENS

No matter how critical your specifications on metal, weave and mesh—no matter how tough your problem of corrosion, pressure, vibration, heat, abrasion—Ludlow-Saylor can ship immediately from stock, or quickly weave a cloth or screen, to meet your needs exactly. For precision manufacture, uniformity and durability, Ludlow-Saylor standards have been the industry's highest for 103 years.



L-S Screens and Cloth can be furnished in any steel, stainless, aluminum, Monel, copper, brass, or any other metal that can be drawn into wire.

**SALES
OFFICES**
**WEST COAST
SUBSIDIARY**

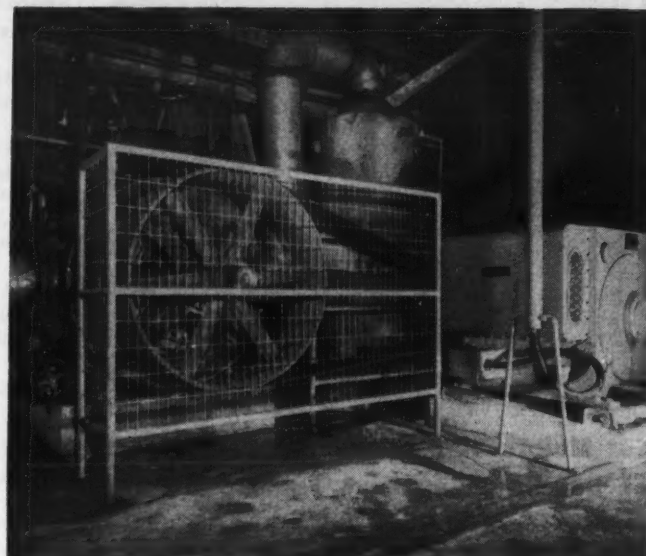
LUDLOW-SAYLOR WIRE CLOTH CO.
614 S. Newstead Ave. • St. Louis 10, Mo.
Birmingham 1727 Sixth Ave., No. Pittsburgh Union Trust Bldg.
Chicago 6261 W. Grand Ave. Houston 5638 Harvey Wilson Dr.
STAR WIRE SCREEN & IRON WORKS
2515 San Fernando Road • Los Angeles 65, Calif.

Write for Condensed Screen Reference Catalog

Check 3004 opposite last page



**PLANT ENGINEERING
MAINTENANCE & SAFETY**
... electrical & mechanical developments



This drive, No. 4 in accompanying tabulation, was placed in service in 1958

Drives withstand wet

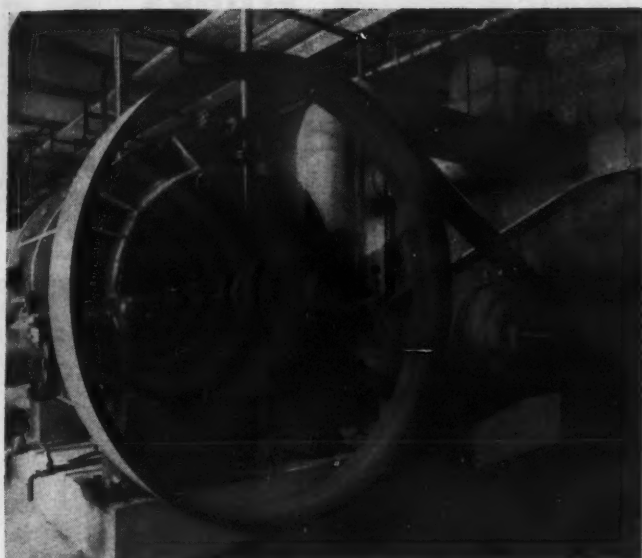
Combining best features of flat belts with those of V-belts, drives used on vacuum pumps save space, keep maintenance costs low

GORDON WEYERMULLER
Associate Editor

Good performance is being obtained at Fraser Paper Limited, Madawaska, Maine, with a drive consisting of a single, endless rubber belt with a series of parallel V-ribs molded lengthwise around the inside circumference. Six of these drives, in the range of 150-200 hp, are used to drive Nash vacuum pumps from electric motors. Pumps remove water from the wet web of paper through the Fourdrinier wire and press felts. Drives have been

unaffected by the wet atmosphere.

Drives are clean and quiet. Maintenance cost on them has been low. One reason they have been installed in some locations is the minimum space they require. Drives combine the best features of flat belts with those of V-belts. Simplicity, flexibility, and strength of flat belts are joined with high speed ratio, short center distances, and positive tracking features of V-belts. V's give



This drive, No. 1 in tabulation, has required little maintenance during five years of service

atmosphere in paper mill

belt nearly three times the traction area of a flat belt of equal width. This increases power of belt and decreases wear.

Belt has an uninterrupted member of high-strength synthetic cords across width. It is a single unit, not a series of belts. Load is evenly dis-

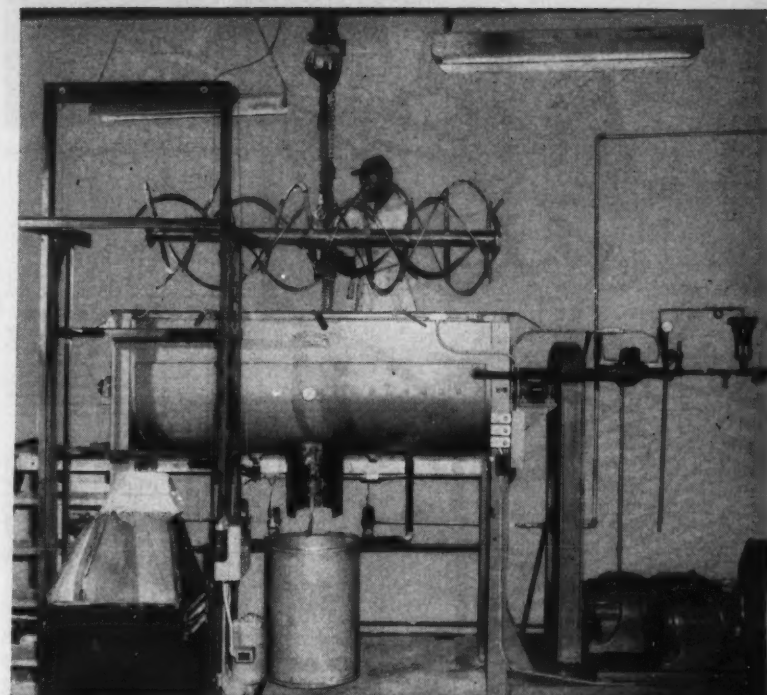
tributed over full width of sheave. Matching problems of multiple V-belts are eliminated.

(Poly-V drive is a patented product of Manhattan Rubber Div., Raybestos-Manhattan, Inc., Passaic, N. J.)

Check 3005 opposite last page.

Resume of Drives in Service at Fraser Paper

	1	2	3	4	5	6
Pump Size (Nash Type)	H-11T	H-11	K-9	K-10A	H-11A	H-11A
Pump Speed	257 rpm	212 rpm	257 rpm	170 rpm	225 rpm	225 rpm
Pump Sheave	52.5" PD	63.5" PD	52.5" PD	84" PD	80" PD	80" PD
Motor hp	250	150	150	200	200	200
Motor Speed	900 rpm	900 rpm	900 rpm	900 rpm	900 rpm	900 rpm
Motor Sheave	15" PD	15" PD	15" PD	15.8" PD	20" PD	20" PD
Belt Width (M)	37 ribs	30 ribs	30 ribs	28 ribs	28 ribs	28 ribs
Belt Length	301" PL	271" PL	271" PL	361" PL	361" PL	361" PL
Brake hp	180	140	140	200	200	200
Year Installed	1954	1957	1958	1958	1958	1958



Features of this installation:

Easily removable Agitator.

Easily cleaned inside construction including removable plasticizer pipe.

Variable Speed Drive.

Jacketed with automatic switches for quick changes from heating to cooling.

Thermocouple for Temperature Control.

PAUL O. ABBÉ supplies
the mixer you need
for the exact job
you have to do.

No matter what your mixing problem, Paul O. Abbé will supply the mixer you need for the job you have to do. Paul O. Abbé mixers are made to your order from standard components. The Mixer shown above was made for a company which does a large volume of commission compounding. Such custom work calls for frequent changes of color and materials. Good blending action is vital. Thorough and quick cleaning is mandatory to prevent contamination and to assure a minimum of downtime.

"Your mixer gives us thorough blending," says the General Manager of the company.

"Our former blender took two to four times longer to clean than the Paul O. Abbé blender . . . your blender is one of our finest functioning machines."

Why use a stock machine that may lack many features you require, when Paul O. Abbé can supply exactly the mixer you need?

To do a better mixing job, reduce downtime and mixing costs, get all the facts about Paul O. Abbé mixers.

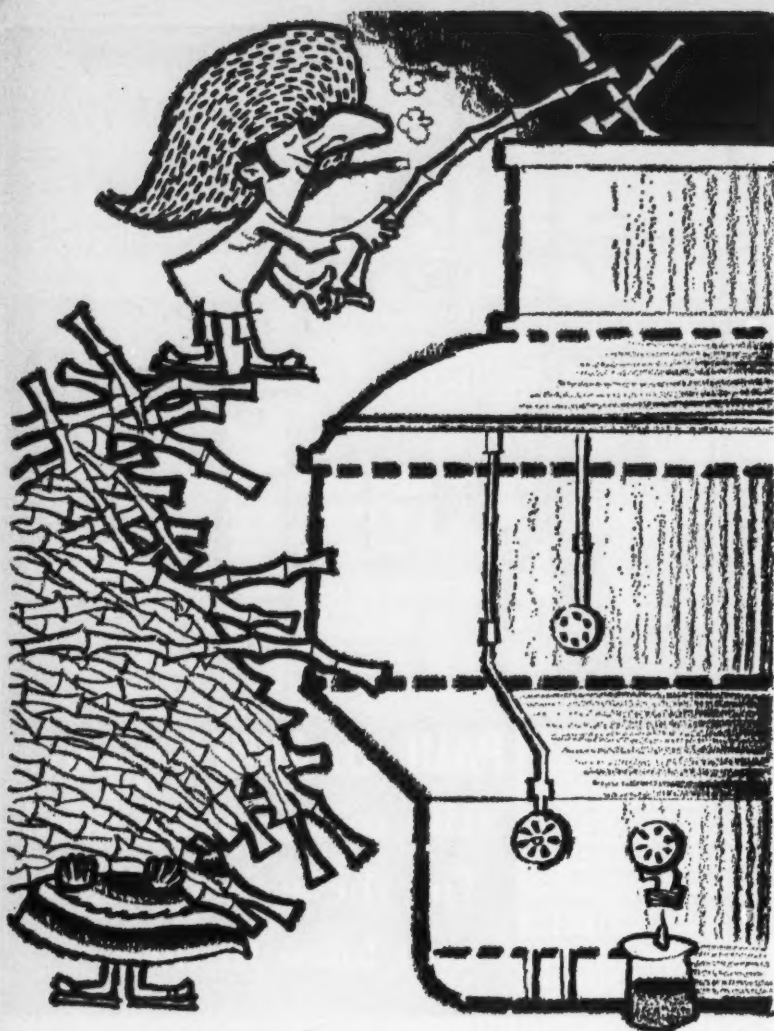
Write today for Catalog V-1.

PAUL O. ABBÉ
GRINDING & MIXING EQUIPMENT
402 CENTER AVE. LITTLE FALLS, NEW JERSEY

PENBLE MILLS
STEEL BALL MILLS
JAR MILLS
JAN ROLLING MILLS

MASS & PASTE MIXERS
RIMON MIXERS
ROTA-CONE BLENDERS
ROTA-CONE VACUUM DRYERS

Check 3006 opposite last page



The man who knows his process equipment... chooses G-B Evaporators!

Jose' could be taught a few things about the fine art of cane syrup evaporation... but not the man who regularly specifies G-B Evaporators.

Men who know their process equipment in the aluminum, paper, sugar and other chemical fields have been specifying G-B evaporators since 1879.

We are loaded with facts, figures and case histories of experts who have chosen G-B equipment. Just whisper and we'll send them to you.



GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.

P.O. BOX 631 • BIRMINGHAM, ALABAMA

Check 3007 opposite last page

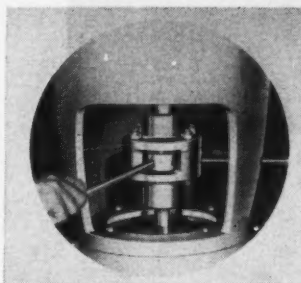
ENGINEERING & SAFETY

**Motor, base, coupling —
all in same unit
in pump drive**

Uses: With industrial short-coupled turbine pumps.

Features: Electric motor, high base, and adjustable coupling are all combined into one unit. Coupling permits fine pump impeller adjustment. Optional coupling spacer permits replacement of pump seals without motor removal.

Description: Vertical solid-shaft pump motor has one-piece cast base as an integral



Vertical solid-shaft pump motor has one-piece cast base as integral part of unit

part. Base has large side opening for easy access to adjustable coupling.

Angular-contact thrust bearing is incorporated. Utilization of baffle system directs spray from any worn pump seals downward. Pump drive is available in 7½- to 125-hp rating on frames 254 to 445.

(Unibase motors are product of U. S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif.)

Check 3008 opposite last page.

Direct-applied insulation has low K-factor

Uses: Insulation of metal and masonry buildings and industrial equipment.

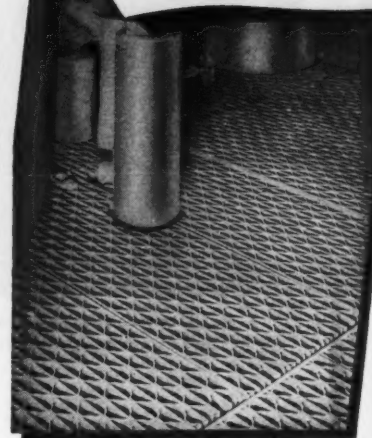
Features: Material may be applied to most types of irregular surfaces without use of special accessories for mechanical attachment or key. It has K-factor of 0.26 Btu/hr/sq ft/inch thickness/°F.

Description: Machine-ap-

BOILER ROOM FLOORS

**MUST
STAY**

**SAFE,
CLEAN**



Ashes, coal and other substances under foot often make solid floors in boiler rooms unsafe.

Such hazardous materials cannot accumulate on a floor made of Irving open steel grating. Debris falls right through, making floors always clean. Dangerous fumes can escape through open grating. Floors made of Irving Grating are clean, safe at all times... no ankle turning, tripping, slipping, hot foots. It is fireproof, self-ventilating.

Manufacturers of Riveted,
Pressure-Locked,
and Welded Gratings of
Steel, Aluminum and other metals.

"A FITTING GRATING
FOR EVERY PURPOSE"

IRVICO

IRVING SUBWAY GRATING CO., Inc.
Originators of the Grating Industry

Offices and Plants at
5050 27th St., LONG ISLAND CITY 1, N. Y.
1850 30th St., OAKLAND 23, CALIFORNIA

Check 3009 opposite last page

CHEMICAL PROCESSING

plied insulating material is blend of refined mineral fibers and inorganic binders. It is machine-spray applied in continuous blanket form.

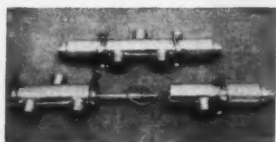
Applied in ½ to 3" thicknesses to surfaces job-coated with special adhesive, insulation material is lightly tamped to produce density of thickness required. Fibers, and integral binders are non-combustible.

Heat-transmission characteristics of insulation, when applied in two-inch thickness to various materials, are:

Material	Heat-transmission coefficient (Btu/hr/sq ft/°F)
8" cinder block	0.10
8" common brick	0.10
Corrugated metal	0.12

(Cafco Heat-Shield is product of Columbia Acoustics and Fireproofing Company, Stanhope, N. J.)

Check 3010 opposite last page.



Piston valves

...have machined cylinders made of Schedule-40 pipe, in which piston with standard O-ring moves across ports to make seal. Valves are both automatic and hand operated.

Valves are made in steel, brass, and other metals. They are available in size range of 1 to 48"

Units are made either straight or angle with screwed or flanged ends. Also, they are available in double units, so that when one valve is opened, another port opens for return.

(Commercial valves are product of Kinwell Corporation, 540 Central Ave., Johnstown, Pa.)

Check 3011 opp. last page.



PRINCIPAL ADVANTAGES:

1. Rugged construction and slow speed insure utmost dependability and minimum maintenance.
2. Whizzer separator gives a wide range of fineness with finger-tip control.
3. Automatic feed control assures maximum capacity — with only part of one man's time required for the mill operation.
4. Combined operations of pulverizing, classifying and conveying offer economies and simplification in plant design.
5. Flexibility of layout.
6. Dust-free operation.

For further details,
write for the Raymond
Roller Mill Catalog #79.

THIS huge 66" Raymond Roller Mill is the heart of the modern equipped plant of the Federal Foundry Supply Division of Archer-Daniels-Midland Company at Colony, Wyoming.

The raw bentonite is first reduced in a slicer ahead of an 8' diameter by 60' long rotary dryer where the moisture is reduced from 30% down to 8%-10%.

The Raymond Roller Mill then pulverizes, classifies and conveys the finished material to storage silos, where the product can go to bag packers or bulk loaders.

This Super Roller Mill has a rated capacity of 500 tons per day at a fineness of 90% minus 200 mesh. It can produce various grades, with classification easily controlled over a wide range.

Archer-Daniels-Midland Company has incorporated automatic control features in the system to permit operation of the entire plant by two men on a shift.

COMBUSTION ENGINEERING, INC.
Raymond Division
1116 W. BLACKHAWK ST.
CHICAGO 22, ILLINOIS

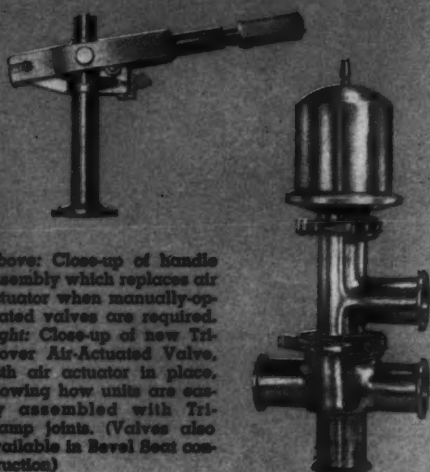
SALES OFFICES IN
PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

Check 3012 opposite last page

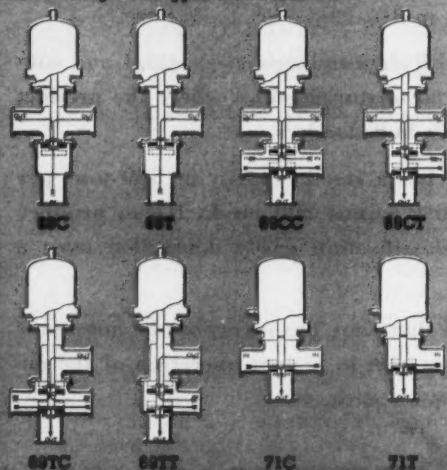
TRI-CLOVER VALVES

to meet a wide range of
Dairy, Food and Beverage
processing operations



Above: Close-up of handle assembly which replaces air actuator when manually-operated valves are required. Right: Close-up of new Tri-Clover Air-Actuated Valve, with air actuator in place, showing how units are easily assembled with Tri-Clamp joints. (Valves also available in Bevel Seat construction)

The drawings below show the various Tri-Clover Air-Actuated Valve arrangements available. The black arrows show inlet and outlet ports when the plug is in the "UP" position. Inlets and outlets when the plug is lowered to the "DOWN" position are indicated with the green arrows. Valves are available in 1½" and 2" O.D. sizes as standard. Data on sizes up to 4" available on application. (Note that both single-acting and double-acting valve types are available.)

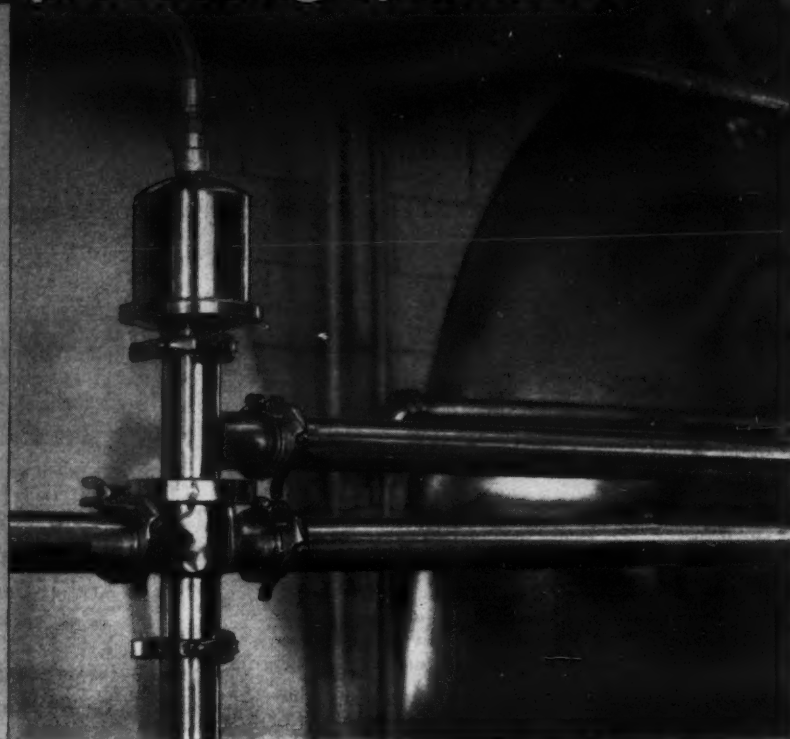


LADISH CO.

Tri-Clover Division
Kenosha Wisconsin

TRI-CLOVER

IN CANADA: Bramford, Ontario
EXPORT DEPT.: 8 South Michigan Ave.,
Chicago 3, U. S. A. Cable: TRICLO, Chicago



Tri-Clover Division's Air-Actuated Sanitary Valves permit easy application of automation and automatic control to many phases of processing and cleaning operations in the dairy, food, and beverage industries. These efficient, air-actuated valves can be locally controlled . . . or remote-controlled from any plant area. Advanced design makes them ideal for use in completely automated installation, such as recirculation operations for in-place cleaning . . . or in a single operation, such as on a filling machine. Manufactured from type 304 stainless steel, these efficient, remote-controlled valves offer fast, positive liquid flow control in any line location, with accurate local or remote control.

Built to extremely high sanitary standards, Tri-Clover Air-Actuated Sanitary Valves assure maximum uninterrupted flow, with a minimum of agitation and friction.

For full details, write for Bulletin A-658, or see your nearest Tri-Clover Distributor.

ARE YOU LOOKING . . .

for more information on any of the products or services mentioned in this issue of CHEMICAL PROCESSING?

Then make use of the Reader Service slip opposite the last page of this issue.

It's easy . . .

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

If several items from the same manufacturer are listed in the story just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

Additional details will be sent direct to you.

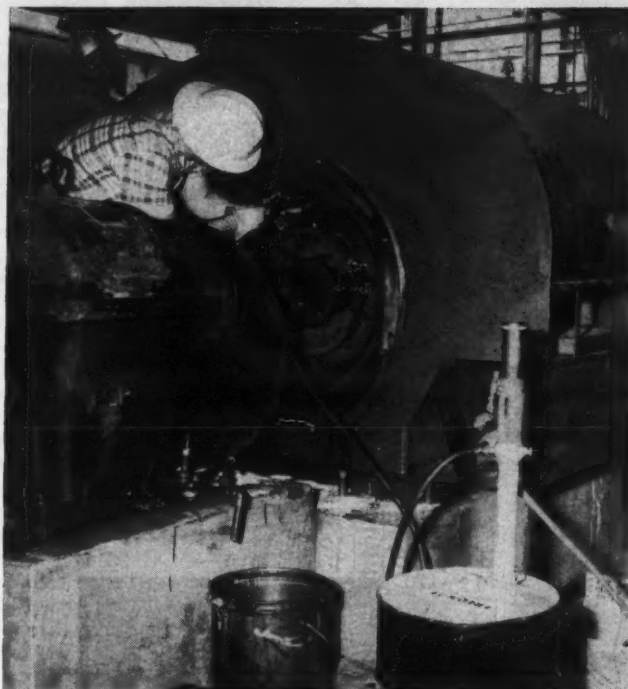
Be sure . . .

to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at left, circle 3013 see information request blank opposite last page.



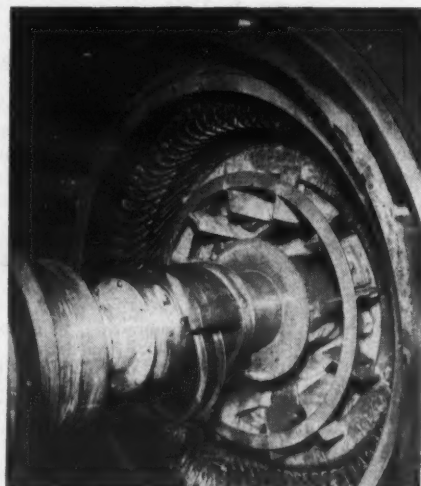
**PLANT ENGINEERING
MAINTENANCE & SAFETY**



Motor is cleaned in place by application of liquid-solvent stream at pressure of 80 psi

Non-flammable cleaning solvents, which will not attack insulation and varnish, pave the way as . . .

In-place motor cleaning cuts costs 80%



PROBLEM: Cleaning of an enclosed 600-hp motor, used to drive a centrifugal refrigeration compressor at Du Pont's Parkersburg, West Virginia, plant, was a time-consuming process.

Necessary dismantling and shipment of motor to an outside cleaning shop, and reassembling upon its return, required services of several men for two whole days.

Solution: Motor was cleaned in place, with minimum dismantling, with non-flammable, non-explosive, and virtually non-toxic solvent.

Only preparation necessary was removal from motor of end bells and coil shields to permit access to armature coil

◀ Clean motor is result of one day's effort and approximately \$80 worth of solvent



**Move air and
material at low cost!**

GARDEN CITY

RF INDUSTRIAL FANS

**Available in
Corrosion Resistant Construction**

Tell us WHAT corrosives in gases, fumes or vapors . . . or dusts, other materials . . . you must combat, and we can give you a construction in a special metal, or a metal with a special coating, properly designed for your application. In order to utilize the most effective corrosive-resistant material for your needs, our engineers must have detailed information about your application.

Garden City Fan Company is a member of Air Moving and Conditioning Association, Inc.

WRITE TODAY!

GARDEN CITY FAN COMPANY
801 North Eighth Street
Dept. P, Niles, Michigan

Send me complete information on your RF Industrial Fans. The fan I am interested in must be resistant to these corrosives:

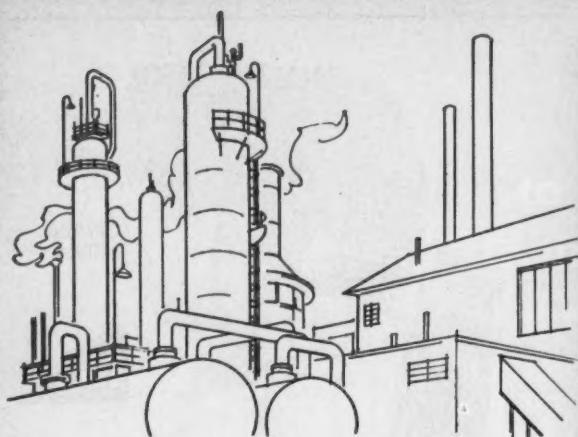
Your name
Company
Street
City State



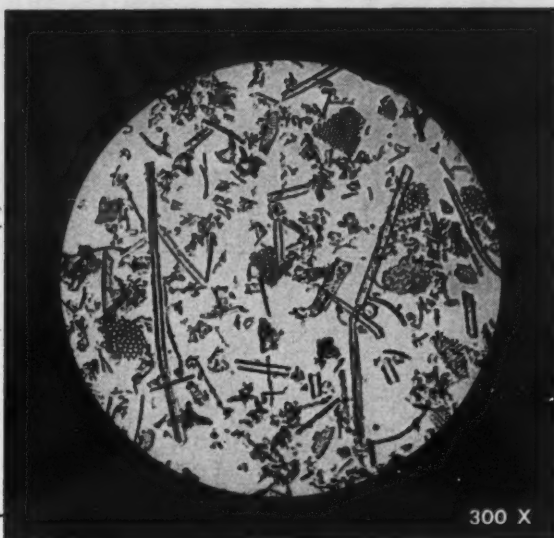
**GARDEN CITY
FAN COMPANY**
ESTABLISHED 1879

Representatives in leading cities
801 North Eighth St., Dept. P, Niles, Michigan

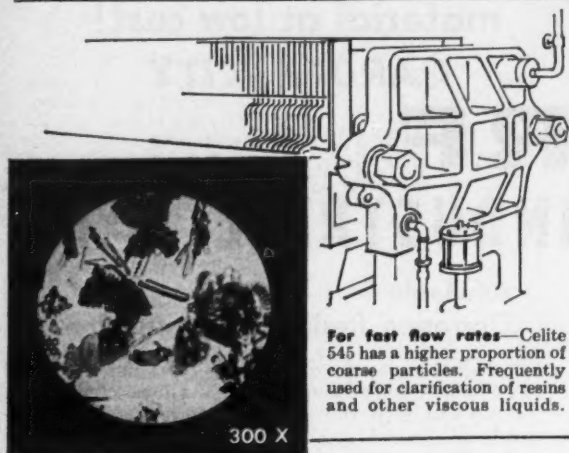
Check 3014 opposite last page



For flow rate plus clarity—Hyflo Super-Cel has the right combination of large and fine particles. Heavily used in chemical processes such as caustic soda production.



300 X



For fast flow rates—Celite 545 has a higher proportion of coarse particles. Frequently used for clarification of resins and other viscous liquids.

300 X



For maximum clarity—Filter-Cel has a relatively fine particle size distribution. Used in producing lard, salad oil, other hydrogenated oil products.



300 X

In diatomites, Johns-Manville precision processing works for you

Celite has the exact grade for every filtration need from fast flow rate to maximum clarity

Study samples of various filtration grades of Celite* diatomite with the unaided eye. Rub them between your fingers. One grade looks, feels very much like another.

Then compare these grades under the microscope. Each has its own distinctive particle size distribution. Each is precision-milled to fill the most exacting filtration requirements, ranging all the way from maximum flow rate to maximum clarity.

Celite 545, for example, with a higher proportion of large to fine particles, is used to remove large suspended impurities at maximum flow rates. *Hyflo Super-Cel*® has a balanced particle size distribution, combines good liquid clarity and moderate flow rate. But *Filter-Cel*® has a much higher ratio of small particles, is tailored for use where high clarity outweighs flow rate.

Whatever your filtration problem—Johns-Manville can furnish the "right"

grade for the job. You have a choice of 9 intermediate grades *plus* many special grades. Each comes from the largest and purest commercially available deposit. Each is processed and graded at the same plant under the same uniform conditions.

For information on specific filtration or mineral filler problems, talk to your nearby Celite engineer, or write to us. Johns-Manville, Box 14, N. Y. 16, N. Y. In Canada, Port Credit, Ont.

*Celite is Johns-Manville's registered trademark for its diatomaceous silica products

JOHNS-MANVILLE



Check 3015 opposite last page

and stator area. Solvent was then applied via liquid stream, at pressure of 80 psi, to the 1/16" coating of oil, grease, and dirt which had accumulated on coil and stator surfaces.

Most of solvent-grease accumulation was then brushed off. Application of high-velocity stream of solvent completed coil and stator cleaning. Finally solvent-dirt mixture was removed from bottom of motor housing.

High volatility of solvent precludes air-spraying. Liquid was ejected in stream from fluid gun equipped with nozzle. Solvent was pumped from drum by reciprocating compressed-air pump. Pump fits into bung of any standard drum.

Results: Solvent cost was approximately \$80. This was a reduction of approximately \$320 over prior cleaning costs. In addition, labor formerly required to dismantle and reinstall motor was saved.

Total labor involved in readying motor for cleaning, and reinstalling coil shields and end bells after cleaning, required 16 hours. Cleaning procedure itself required two hours. Motor was ready for use on following day. No damage to motor winding through use of solvent has been reported or is anticipated.

("Freon"-TF solvent is product of "Freon" Products Division, E. I. du Pont de Nemours & Company, Nemours Bldg., Wilmington 98, Delaware.)

Check 3016 opposite last page.

(Models OB138 fluid nozzle, 31 fluid gun, and 41-8500 Pogo pump are products of Binks Manufacturing Company, 3114 W. Carroll Ave., Chicago 12, Illinois.)

Check 3017 opposite last page.

Industrial compressors, of oil-free heavy-duty type, are detailed in bulletin, giving complete descriptions of, and rundown on, applications of various models. Bul A-92 — Joy Manufacturing Co., 307-33 Oliver Bldg., Pittsburgh 22, Pa.

Check 3018 opposite last page.

More Accurate
Level Reading
of **LOW**
TEMPERATURE
LIQUIDS...
JERGUSON
Large Chamber
NON-FROSTING*
GAGES

You get the highest possible accuracy of reading on low temperature, low boiling point liquids with the patented Jerguson Non-Frosting Gage in the New Large Chamber model . . . because it insures less turbulence at the meniscus, and clear vision at the vision slot.

This new Jerguson model has 6 times larger area at the meniscus than the standard gage, so that there is a marked reduction in turbulence with light gaseous fluids that tend to boil or surge. Moreover, the problem of frosting encountered with these liquids has been eliminated by a patented frost preventing unit extending from the gage glass. This special transparent unit projects beyond the cover bolts and prevents frost from building up over the vision slot.

Here's a dual feature gage that assures greatly increased accuracy of reading for the process industries. If you have a problem with light gaseous fluids, or with gage frosting, it will pay you to investigate the new Jerguson Large Chamber Non-Frosting Gage . . . reflex or transparent.



Jerguson Large Chamber Gage, Transparent Type, with the patented Non-Frosting Gage Glass Extension. Write for literature on this gage, and on other non-frosting Jerguson models.

**Patented*

JERGUSON

Gages and Valves for the
Observation of Liquids and Levels

JERGUSON GAGE & VALVE COMPANY
100 Adams Street, Burlington, Mass.

Offices in Major Cities

Jerguson Tress Gage & Valve Co., Ltd., London, Eng.
Pétrole Service, Paris, France

ENGINEERING & SAFETY

**Cellular-glass insulation
easily installed
on pipe**

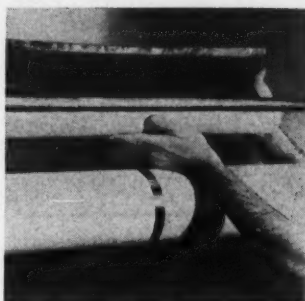
Covering can be installed
after hanging pipe

Uses: Applications on hot and cold commercial pipe installations.

Features: Installations can be quickly and easily installed (see photograph below). High compressive strength permits installation either before or after hanging pipe.

Description: Rigid cellular-glass pipe insulation is for service in temperature range of 35 to 350°F. Priming of pipe is not necessary prior to installation of insulation.

The 24" section opens lengthwise and fits around pipe. Overlapping longitudinal



Rigid cellular-glass insulation sections open lengthwise and fit around pipe

seam of kraft-foil laminate is then sealed with lapping cement and banded on 12" centers. End joints are sealed with factory-furnished three-inch vapor-barrier strip.

Pipe covering is available in nominal thicknesses of 1 and 1½" for steel pipe or copper tube in ½ to 6" size range. It is shipped in 24" lengths.

(Foamglas pipe covering is product of Pittsburgh Corning Corporation, One Gateway Center, Pittsburgh 22, Pa.)

Check 3020 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



Save time! Save money!



Repair **corroded concrete with
Penntrowel**

Surfacing Compounds

Badly corroded concrete and cement surfaces in your plant don't have to cost you long shut-downs and expensive contracting jobs. You can *repair* those damaged areas with new PENNTROWEL Surfacing Compounds.

PENNTROWEL is tough. Its impermeable, corrosion-resistant coating turns away acids, alkalis, solvents . . . gives long service . . . doesn't crack or slough off.

PENNTROWEL is easy to use. You mix it right at jobsite, then just trowel it on . . . need no expensive equipment to mix and apply.

PENNTROWEL cures fast. Apply in afternoon, use surface next day!

PENNTROWEL is economical. Materials and surface preparation costs are amazingly low. And PENNTROWEL reduces future maintenance costs.

PENNTROWEL is available in three specialized grades . . . for corrosion protection, fluorine service and heavy wear. Write for descriptive folder and installation cost data.

Ask for a Demonstration We'll be glad to demonstrate PENNTROWEL's remarkable abilities to you right in your plant. Call or write today to arrange a test.

**Pennsalt
Chemicals**

ESTABLISHED 1900

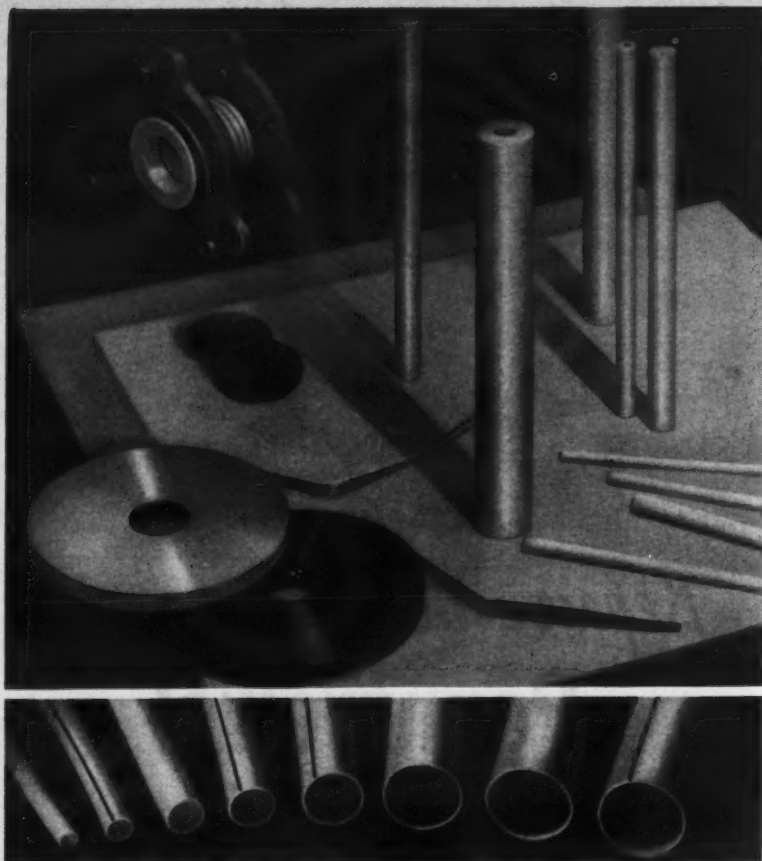
Corrosion Engineering Products Dept. 681
PENNSALT CHEMICALS CORPORATION
Natrons, Pa.

Penntrowel is a trade-mark of Pennsalt Chemicals Corp.

Check 3019 opposite last page

JULY 1959

Check 3021 opposite last page



A fraction of R/M's extensive line of "Teflon" products. (upper) New "Teflon" expansion joint has square convolutions for extra strength. Other products include sheets, tubes, rods, tape and bondable "Teflon." (lower) Thin-wall tubing is now available with or without color striping.

Take advantage of R/M'S COMPLETE TEFLON* SERVICE

Need 1/32-in.-thick "Teflon" in 36 x 36 in. sheets . . . 48 x 48 in. sheets of greater thicknesses? Or custom fabricated "Teflon" parts made to your exact design requirements? Whatever your "Teflon" needs may be, R/M's complete service—a broad range of sizes, plus ample facilities for extruding, molding or machining special pieces, precisely to your specifications—means faster, simpler meeting of your "Teflon" requirements—and assurance of complete satisfaction.

In addition, you can benefit from R/M's extensive research and development in the use of "Teflon." Competent R/M sales engineers are always available to assist you in making full use of its many unique properties.

For full information about R/M "Teflon" expansion joints, tubes, thin-wall tubing, rods, sheets, tape, bondable "Teflon," and "Teflon" parts, contact your nearest R/M district office. Or write for detailed literature.

*A Du Pont trademark



RAYBESTOS-MANHATTAN, INC.

PLASTIC PRODUCTS DIVISION FACTORIES: MANHEIM, PA.; PARAMOUNT, CALIF.

Contact your nearest R/M district office listed below for more information or write to Plastic Products Division, Raybestos-Manhattan, Inc., Manheim, Pa.

BIRMINGHAM 1 • CHICAGO 31 • CLEVELAND 16 • DALLAS 25 • DENVER 16 • DETROIT 2 • HOUSTON 1
LOS ANGELES 56 • MINNEAPOLIS 16 • NEW ORLEANS 17 • PASSAIC • PHILADELPHIA 3
PITTSBURGH 22 • SAN FRANCISCO 5 • SEATTLE 4 • PETERBOROUGH, ONTARIO, CANADA

RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber
Sintered Metal Products • Rubber Covered Equipment • Abrasive and Diamond Wheels • Brake Linings
Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

Check 3022 opposite last page

ENGINEERING & SAFETY



Safety hand lamp

. . . is said to be most powerful dry-cell safety spotlight on market. Stainless-steel lamp throws 1500-ft beam.

Lamp has exclusive adjustable focus. Adjustment of knobs gives 1/2-mile beam or broad diffused light. Also available with matte reflector, hand lamp uses standard six-volt double-pack battery.

(Model 281-GB commando safety lamp is product of Koehler Manufacturing Company, Marlboro, Mass.)

Check 3023 opp. last page.

material contains no volatile solvents.

Description: Base of repair material contains epoxy resin; hardener incorporates a polyamide. Equal parts of base and hardener are mixed with trowel or spatula to neutral-grey composition. Wetting capacity of polyamide results in smooth fast mixing.

Speed of reaction depends on temperature and amount mixed. At room temperature, cured repair material is hard to touch in four hours and can be walked on in eight hours. Curing is speeded by heat application.

(Plastic Mastic repair kit is product of Williamson Adhesives, Inc., 8220 Kimball Ave., Skokie, Ill.)

Check 3024 opposite last page.

Application of solvents in tank cleaning aided by tool

Cleaning service controlled from outside tank

Uses: Application of solvents in chemical cleaning of storage-tank interiors.

Features: After unit is installed, cleaning service can be controlled from outside of tank. Thus personnel are not exposed to toxic fumes or solvents.

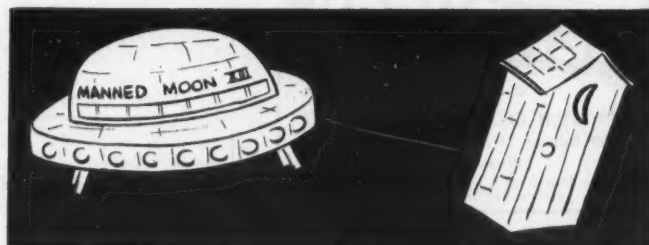
Description: Automatic high-pressure hydraulic jetting tool utilizes high-velocity streams of solvents to remove scale, sludge, and other undesirable deposits from internal tank surfaces.

Solvents are sprayed from

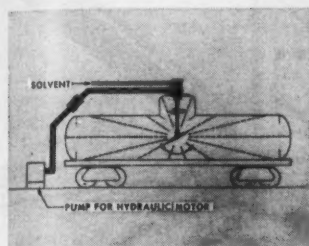
Epoxy and polyamide join forces to bind

Uses: As general repair material for practically all materials including most plastics. Also, in construction and installation jobs such as machinery and equipment, tiles, flooring, and wallboard.

Features: Non-flammable



two nozzles in revolving jet head powered by hydraulic motor. Head rotates through 360°, both horizontally and vertically. Cleaning fluids are



Automatic high-pressure hydraulic jetting tool revolves streams of solvents to every part of tank interior

fed from line emanating from special truck-mounted pump outside tank. Other lines carry fluid which powers hydraulic motor.

(Tank-cleaning tool is product of Dowell Division, The Dow Chemical Company, Box 536, Tulsa, Okla.)

Check 3025 opposite last page.



Resuscitation

... by approved mouth-to-mouth technique is made more acceptable by use of special unit.

Resuscitator consists of flexible tube attached to mask which fits over mouth and nose of patient. Valve permits passage of air only from rescuer to victim. Construction of face mask insures tight seal.

(M/M mouth-to-mask resuscitator is product of Globe Industries, Inc., Dayton, Ohio.)

Check 3026 opposite last page.

LIQUID

METERING

**CAN BE SIMPLE,
INEXPENSIVE ...**

and Save You Money!

Perhaps you've felt the need to meter your industrial liquids but have hesitated because you feared metering was costly or complicated. Actually, even a plant-wide installation of simple, direct reading Rockwell meters can be made very easily and for a nominal investment. They will pay their way many times over by providing realistic records for cost, inventory and utilization controls.

Measure Even Corrosive Liquids. Among the many types of Rockwell meters, there is the right design to measure most anything that flows . . . including *all stainless-steel meters* for corrosive liquids.

If you blend, batch or package liquids, Rockwell meter accessories such as automatic shut-off controls, impulse counters and remote registration will cut your costs and increase production. Use the coupon for full details.

INDUSTRIAL METERS

another fine product by

ROCKWELL

CLIP COUPON—MAIL TODAY

ROCKWELL MANUFACTURING CO.
Pittsburgh 8, Pa.

Gentlemen

I am interested in measuring _____ (Name of Liquid)

Pipe Size _____
Working Pressure _____ psi Temperature _____ °F max.
Max. Flow Rate _____ gpm Min. Flow Rate _____ gpm

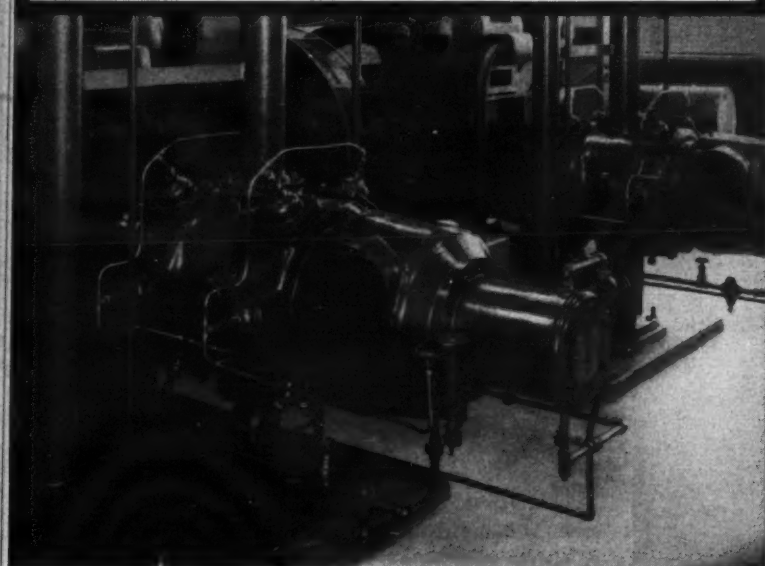
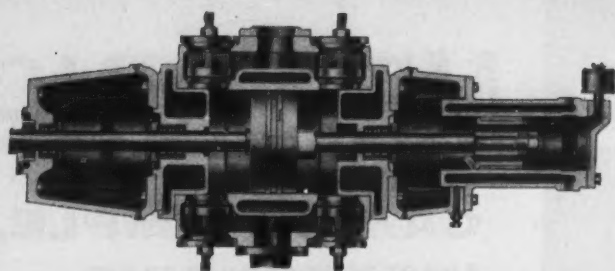
Your Name _____

Company _____

Street _____

City _____ Zone _____ State _____

Check 3027 opposite last page



***with PENNSYLVANIA tailrod construction,
COMPRESSORS PROVIDE GUARANTEED
OIL-FREE AIR...eliminate contamination**

If your processes stand the chance of being ruined by the least contamination, better look into Pennsylvania Oilfree Compressors today. They are built specifically to eliminate any lubricant or oily vapor which would interfere with delicate instruments, contaminate food and beverages or be incompatible with chemical processes.

*Pennsylvania Oilfree construction is one reason that we can guarantee oil-free compressed air or gas. An extra long distance piece between compressing cylinder and main frame assures that no part of the piston rod which enters the lubricated frame will alternately enter cylinder stuffing box. Result: a compressor with isolated cylinder which will deliver air or gas guaranteed entirely free of oil or oily vapors due to lubricants. Pennsylvania tailrod construction produces a full floating piston which prolongs the life of carbon piston rings and eliminates the danger of piston riding against cylinder walls.

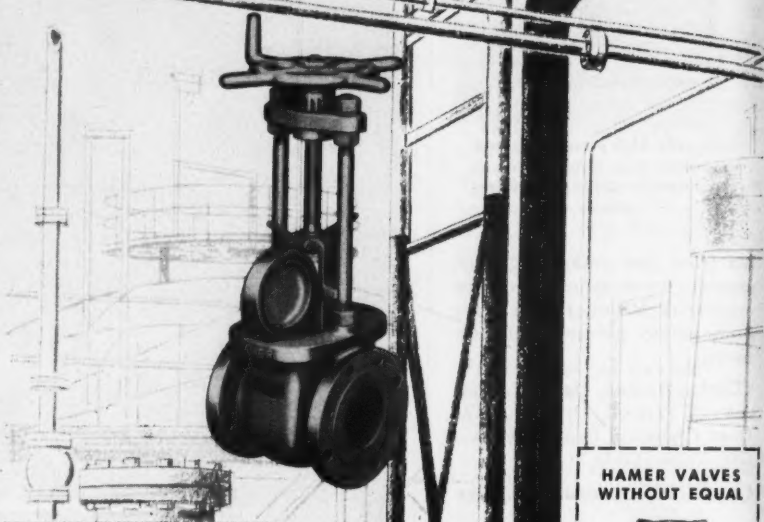
Get full details on Pennsylvania 3-ATC Compressors. Send for free copy of Bulletin 351, today.

PENNSYLVANIA PUMP AND COMPRESSOR CO.

Easton, Pa. • Earning customer confidence since 1920

Check 3028 opposite last page

PUTTING THE "ABSOLUTE" IN LINE SHUT-OFF...



Hamer Line Blind Valves

It has long been recognized that convention type valves do develop leaks. And contamination of product when it occurs costs dearly in time and money. Preventing this is where Hamer Line Blinds excel. Handwheel or bar operated, Hamer Line Blind Valves squeeze dead tight against the center spectacle plate forming an impassable line shut-off that's both permanent and absolute. Yet Hamer Line Blinds are fast, safe, simple to operate. One man can open or blind a line in one minute. Investigate Hamer Line Blinds. Let a Hamer representative show you how these remarkable valves can actually pay for themselves.

SEND FOR FREE CATALOG

Hamer

VALVES INC.

P. O. Box 1851
2919 Gardenia Ave., Long Beach 1, Calif.
Representatives throughout the World

Check 3029 opposite last page

HAMER VALVES WITHOUT EQUAL



Leak-proof Gate Valve



Line Blind Valves



Lift-type Plug Valve

#59-3

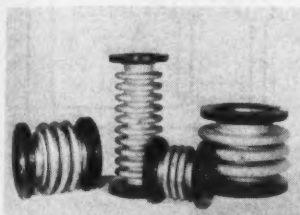
CHEMICAL PROCESSING

**Test-rated cyclic life
for bellows joints**

Uses: Application in certain fluid catalytic processes which rely on thermal head to keep fluid moving and require short straight pipe to keep pressure drop at minimum. Also, in areas where restricted space precludes installation of conventional pipe layouts.

Features: Joints have test-rated interrelation between traverse, pressure, and cyclic life.

Description: Stainless-steel bellows expansion joints for



Variety of bellows expansion joints are available

pipe will be initially produced in 3 to 30" nominal pipe sizes for applications to 275 psi and 750°F.

Units can provide flexibility in short pipe which connects process equipment so that expansion, contraction, vibration, and misalignment do not impose excessive stresses.

(Bellows expansion joints are product of Tube Turns Division, Chemetron Corporation, 224 E. Broadway, Louisville 1, Kentucky.)

Check 3030 opposite last page.

Wire cloth in stock items and fabricated to needs is itemized in 94-page Wire Cloth Cat—Department F, The Cambridge Wire Cloth Co., Cambridge 7, Mass.

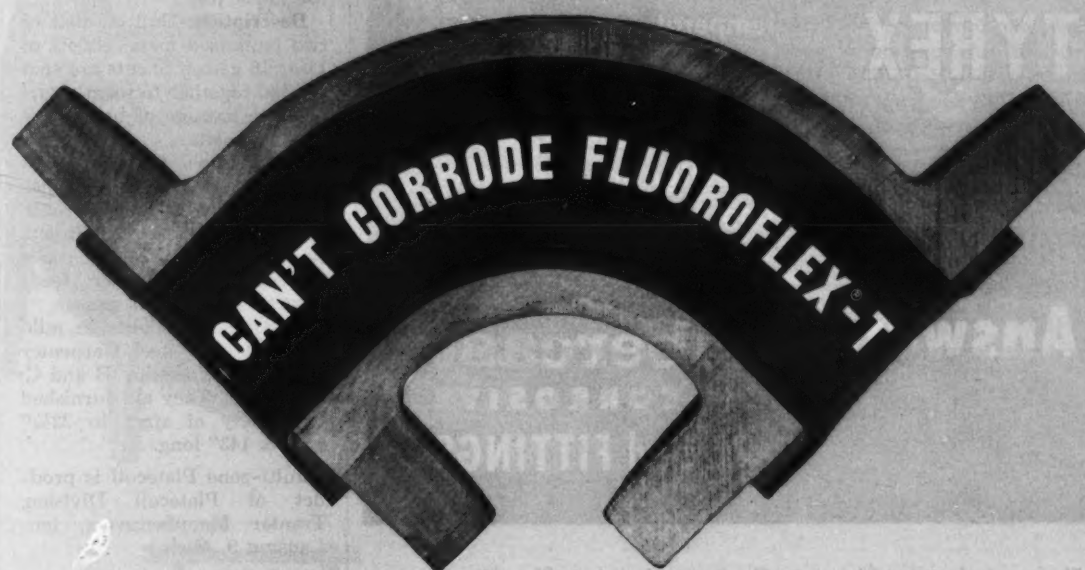
Check 3031 opposite last page.

Air conditioning zone-control cabinets are treated in 20-page bulletin. Tables, curves, and sketches, covering unit selection, physical data, dimensions, fan performance, and coil ratings for water cooling, direct expansion, and hot water and steam, are included in Bul AC-220 which may be obtained by writing on company letterhead to Buffalo Forge Company, 490 Broadway, Buffalo 5, N.Y.

any acid

...in any concentration

...at any temperature to 500°F



TEFLON® AT ITS BEST BY A PATENTED PROCESS

Fluoroflex-TS fittings are lined with specially processed* Teflon to provide maximum density and minimum crystallinity. These characteristics are essential to assure a non-porous lining free from fatigue cracks. Type TS fittings are maintenance-free even in the most corrosive service.

Liners are seamless with smooth contours for maximum flow and minimum back pressure. Housings are one piece ductile iron with 150# ratings to ASA dimensional standards (modified side outlet "Tee"). Ells are short radius for compact systems; reducing flanges are tapered. Change of direction or flow is never abrupt. Fluoroflex-TS fittings will mate with any 150# flange connections in existing piping systems.

Proven in continuous service, Fluoroflex-TS pipe handles the toughest problems of corrosion, erosion and contamination—with complete safety. Write Dept. 271 for Bulletin TS-1A, RESISTOFLEX CORPORATION, Roseland, N. J.

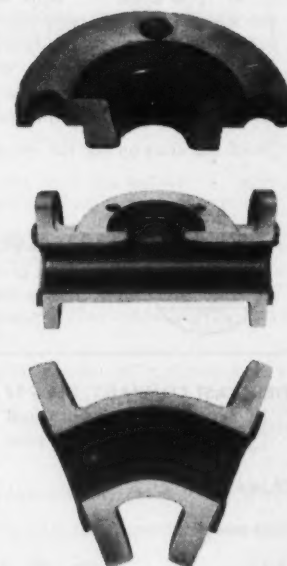
*Fluoroflex is a Resistoflex trademark, reg., U.S. pat. off.
*Teflon is DuPont's trademark for TFE fluorocarbon resins.

* Pat. No. 2,752,637

Complete systems
for corrosive service

RESISTOFLEX

Check 3032 opposite last page



Problem:

TYREX

The manufacturers of Tyrex, the revolutionary new tire cord, had a real problem: A pipe to transport highly corrosive liquids at extremely high temperatures.

After extensive exploring, investigating, checking and testing, they found the

Answer: Fibercast[®]
NON-CORROSIVE
PIPE and FITTINGS

The proven fact that Fibercast will not corrode is in itself justification for its use by the makers of Tyrex. But there are other important time- and money-saving benefits. For example:

Takes high temperatures — up to 300° F . . . High operating pressures — to 1000 p.s.i. . . . Light and easy to handle — being less than 1/4 the weight of steel, requires a minimum in manpower and equipment for installation . . . Pre-fabricating Service — In many systems, pre-fabrication of assemblies at the factory by Fibercast specialists, working from your prints, with installation by your plant personnel, will be more practical and economical.

Send the coupon for full information and complete data.



FIBERCAST COMPANY

A DIVISION OF THE YOUNGSTOWN SHEET AND TUBE COMPANY
 Phone Circle 5-1301 • BOX 727 • TWX Sand Springs 480
 SAND SPRINGS (TULSA), OKLAHOMA

FIBERCAST COMPANY, Box 727, Sand Springs, Okla., Dept. 879

- ☐ Send your new Data and Information Bulletin No. 20.
☐ Full information on your Pre-fabricating Service.

Name _____ Title _____

Company _____

Address _____

City _____ State _____

Check 3033 opposite last page

ENGINEERING & SAFETY

Coil design tosses curve at heat-transfer problems

Uses: Pipe-coil heat-transfer applications.

Features: Coil design, improved from that of previous models, permits better distribution of heating or cooling media. Units are qualified for use to 250 psi.

Description: Unit consists of two embossed metal sheets of 14 or 16 gauge. Sheets are spot welded together to form channels for passage of heating or cooling media.

Design incorporates three headers which are branches of main line as it enters unit. Headers supply media directly to three horizontal zones of coil. Each header feeds bank of horizontal passes.

Units are available in mild steel, stainless steel, Carpenter 20, Monel, Hastelloy B and C, and nickel. They are furnished in variety of sizes to 22 1/4" wide x 143" long.

(Multi-zone Platecoil is product of Platecoil Division, Tranter Manufacturing, Inc., Lansing 9, Mich.)

Check 3034 opposite last page.

Electric insulating materials are listed in detail in 12-page bulletin, including data on characteristics and applications. Bul GET-2929 — Insulating Materials Department, General Electric Company, 23 River Rd., Schenectady 5, New York.

Check 3035 opposite last page.

Three-port valve manifold provides sure protection against tank shutdown

Relief capacity is adequate for 30,000-gal NH₃ tank

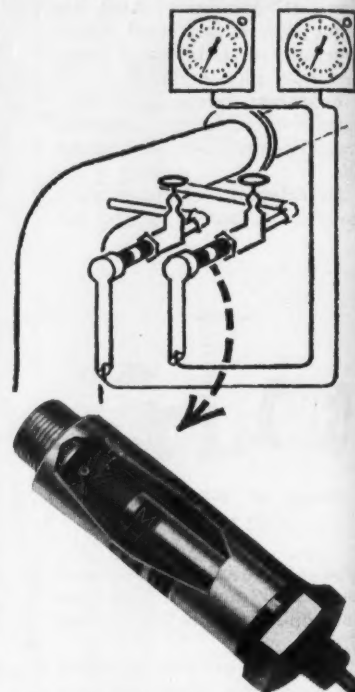
Uses: Safety-relief applications in NH₃ service.

Features: Manifold provides positive protection against tank shutdowns, necessitated by periodic removal of relief valves for replacement and/or testing. Two of the three valves, alone, provide adequate safety-relief capacity for a 30,000-gal anhydrous-ammonia tank.

Description: Three-port

MEASURING PRESSURE?

For greater accuracy use precision-calibrated SR-4[®] Pressure Cells



If you are measuring or controlling fluid pressure, you should know these facts about accurate, rugged SR-4[®] Pressure Cells. Standard accuracy: $\pm 1/4\%$ (higher accuracies available for calibration). Calibration does not change with time. Contact fluid directly; require no external piping. Contain no moving parts. Output signal suitable for remote indication, recording or control. Widest pressure range coverage of any commercially-available transducers: 0 PSIA to 100,000 PSIG. Low line, low differential and high frequency models available. Special configurations can be provided.

Write for more information—address Dept. 16-G, and ask for Bulletin 4365

FIRST in force measurement



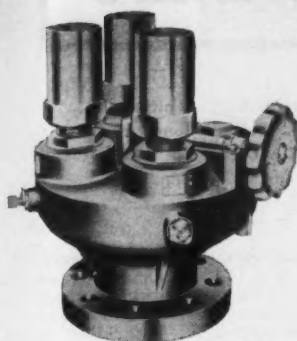
BALDWIN-LIMA-HAMILTON

Electronics & Instrumentation Division
 Waltham, Mass.

SR-4[®] Strain Gages • Transducers • Testing Machines

Check 3036 opposite last page

CHEMICAL PROCESSING



Three-port safety-release-valve manifold permits removal of any one of three valves while tank is under pressure

safety-release-valve manifold permits removal of any one of three safety-relief valves while tank being serviced is under pressure. Relief valve on manifold can be removed after revolving disc, manipulated by a large hand wheel, is positioned under it.

Manifolds are available in either 6% or 7% bolt circle diameters. They also have 4" port diameters, and are 14% high and 14" in width.

(Three-port relief-valve manifold is product of The Bastian-Blessing Co., 4201 W. Peterson Ave., Chicago 46, Illinois.)

Check 3037 opposite last page.

Situation firmly in hand with work gloves

Uses: For use in most water solutions of acids, alkalis, and salts and in ketones. Also for handling paint and varnish removers, naphthas, alcohol, gasoline, and lacquers.

Features: Diamond-shaped grip pattern provides good gripping action on wet or slippery objects.

Description: Gloves are made of latex and neoprene with soft-cotton inner lining. They are available in 7 to 12" lengths.

(Wil-Gard soft-lined latex gloves are product of Industrial Div., The Wilson Rubber Company, Div. of Becton, Dickinson and Company, Canton, Ohio.)

Check 3038 opposite last page.

BRIGHTON LAB AND PILOT PLANTS

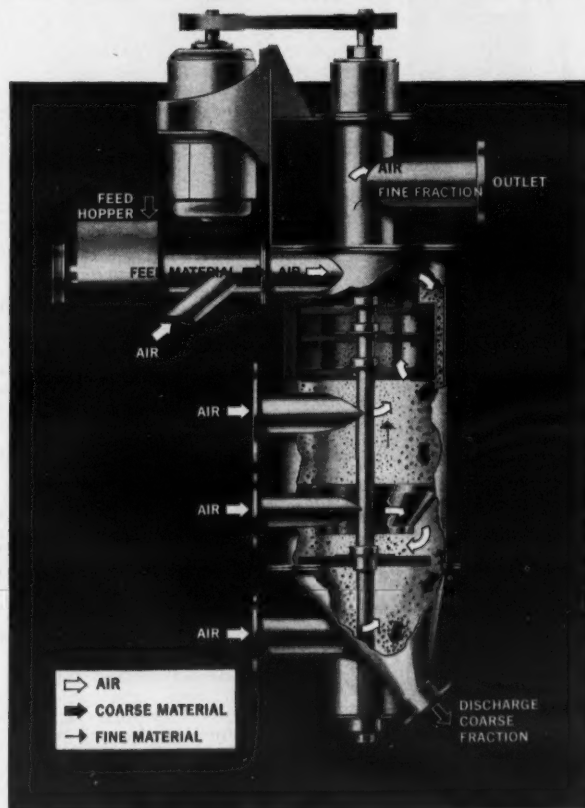


are designed to simulate and produce the same percentage of conversion as commercial counterparts

"Look Before you Leap" at the precise results you can obtain from a pilot plant by BRIGHTON, before you move into full scale production of a product. Brighton Pilot Plants produce data consistent with commercial operations, save you time and money. Stainless Steel construction provides physical strength at operating temperatures; is corrosion and oxidation resistant, and prevents contamination which could affect control equipment, product purity, product distribution and catalyst activity. Write For Catalog.

BRIGHTON
METALSMITHS CORPORATION
EST. 1914 820 STATE AVENUE - CINCINNATI 4, OHIO

Check 3039 opposite last page



Get the fraction you want more efficiently with the new MAJAC AIR CLASSIFIER!

MAJAC AIR CLASSIFIER allows finer cut points . . . with considerably sharper classification than any other method.

OPERATES more efficiently than any other classifier . . . providing a higher yield of desirable end product.

MORE PRECISE particle size control is possible with the Majac Air Classifier than with any other classifier . . . and with a wide range of cut points.

PERMITS HANDLING and classification of material in dry state.

HUMIDITY CONTROL, drying, blending, coating and controlled chemical reactions can be carried on simultaneously with classification.

Sizes for lab, pilot plant or production use in a wide range of capacities.

Write today for detailed information or visit by qualified Majac representative.

MAJAC, INC.

Twenty-third St., Sharpsburg, Pittsburgh 15, Pa.

Designers and manufacturers of pulverizing, classifying and separating equipment for industry.

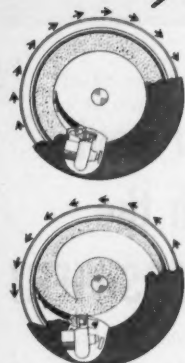
Check 3040 opposite last page

ROBERTS CENTRIFUGALS

2647

THE
SAFEST
YOU
CAN
BUY

for CPI



REVERSE PLOWING—Eliminates the hazard of accidental plowing during the high speed spinning operation. (See illustration.)

OVERLOAD PROTECTION—Loading concluded automatically when basket has received predetermined charge.

UNBALANCED-LOAD PROTECTION—Gyraton Switch protects machine against possible damage caused by unbalanced load.

TEMPERATURE—Thermal protection built into the motor.

CURBING—Enclosed or vapor tight.

BRAKING—Regenerative, mechanical, safe, quick, and smooth.

Hope you don't think we're *PUSHING* too hard, but safety could be as important as performance. The ROBERTS machine provides both. Check it for yourself! Ask for our free Descriptive Data Unit No. 2647.



Check 3041 opposite last page



new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

Plastic-coated pipe and tube is covered in six-page bulletin, incorporating background discussion and specifications. X-Tru-Coat Bul —Republic Steel Corporation, 1405 Republic Steel Bldg., Cleveland 1, Ohio.

Check 3042 opposite last page.

Screening-feeders, of vibrating type, are described and specified in two-page catalog section. Screening-Feeder Literature—Syntron Company, 110 Lexington Ave., Homer City, Pa.

Check 3043 opposite last page.

Mechanical seals in service are subject of Bul CP-551 and 575—Chemical & Power Products, Inc., 9 Broadway, New York 4, N.Y.

Check 3044 opposite last page.

Ethylene amines are treated in 65-page book which includes properties, reactions, uses, first-aid techniques, and bibliography covering patent and use sources. "Ethylene Amines" — Organic Chemical Intermediates Sales, The Dow Chemical Company, Midland, Mich.

Check 3045 opposite last page.

Metal fabricating techniques and facilities are presented in 26-page booklet, containing information on engineering, design, and production facilities. Metal Fabrication Booklet — Tower Iron Works, Inc., 50 Borden St., Box 1314, Providence, R. I.

Check 3046 opposite last page.

Strain-gage resistance characteristics of eight U. S. manufacturers' products are compared in 24-page article, "How To Select A Strain Gage" — Stein Engineering Services, 5602 East Monte Rosa, Phoenix, Ariz.

Check 3047 opposite last page.

Industrial trucks are classified in 12-page condensed catalog. Complete specifications and photographs are given for fork trucks, low-lift platform trucks, and mobile cranes. Condensed Truck Catalog—The Elwell-Parker Electric Company, 4205 St. Clair Ave., Cleveland 3, Ohio.

Check 3048 opposite last page.

Nuclear-reactor pumps are cataloged in a bulletin. Description of work done on critical limited-leakage pump developed for atomic-fuel submarines is included in Nuclear-reactor-pump Bul — Peerless Pump Division, Food Machinery and Chemical Corporation, 230 West Ave. 25, Los Angeles 31, Calif.

Check 3049 opposite last page.

Electrical-instrumentation and/or control-panel case-history applications are summarized briefly in eight-page brochure, "Case Histories" — U. S. Controls Inc., 410 Fourth Ave., Brooklyn 15, N. Y.

Check 3050 opposite last page.

Roller mills which pulverize, classify, and convey materials to storage are introduced in Cat 79—Raymond Division, Combustion Engineering, Inc., 1116 W. Blackhawk St., Chicago 22, Ill.

Check 3051 opposite last page.

Leasing of machinery and equipment is explained in simplified terms in 12-page brochure. How leasing works, why it is needed, and advantages are cited. "Leasing" may be obtained from United States Leasing Corp., 130 Montgomery St., San Francisco 4, Calif.

Check 3052 opposite last page.

Multi-purpose recorder is fully delineated in 18-page bulletin, incorporating detailed summary of operation and applications of instrument. Bul R—E. H. Sargent & Co., 4647 W. Foster Ave., Chicago 30, Ill.

Check 3053 opposite last page.

Glass insulation for piping or equipment is listed in detail in Industrial Insulation brochure—Department CP-49, Pittsburgh Corning Corporation, One Gateway Center, Pittsburgh 22, Pa.

Check 3054 opposite last page.

Fire control chart explains three classes of fires and shows approved portable extinguishers to be used on each type. Fire Control Chart—Walter Kidde & Company, Inc., Main St., Belleville, N.J.

Check 3055 opposite last page.

THAT'S
INTERESTING

**'Firing up'
proboscis**

Using the olfactory may keep the old factory from going up in a blaze. Pinkerton's National Detective Agency tells security guards proper sniffing on a guard's first round of duty can eliminate over 90% of the causes of after-hours business fires. Pinkerton urges guards to use their noses as guides to find a fire before automatic detection devices sound an alarm.

**Long-range
forecasting**

A hypodermic syringe is used by Shell Oil chemists at Emeryville, Calif., to measure filterability of fuel oil, enabling them to predict sludge-freezing properties over long periods of storage. Test tells in 15 minutes what nature will do in up to 18 month's storage.

For more information on product at right, specify 3056 see information request blank opposite last page.



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any RPM!"



*variable speeds direct from
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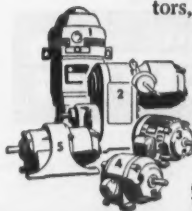
U.S. VARIDRIVE MOTORS

Smooth, stepless speed changes to the split RPM—with the simple, completely self-contained U.S. VARIDRIVE MOTOR! Just plug into any standard AC power line.

Why bother with DC Converter, DC Generators, complicated electronic tubes and circuits

that require special technicians? Why risk costly production shutdowns?

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NEW PLASTIC UNIT RESISTS CORROSION AND CONTAMINATION

As usual, Vanton is first in another plastic fluid handling innovation: an all-PVC centrifugal! All wetted parts of this new pump are constructed of unplasticized, unmodified polyvinyl chloride, offering the broadest possible resistance to chemical corrosion, **PLUS** non-contaminating transfer of sensitive solutions, **PLUS** a cost lower than most alloy pumps for similar applications!

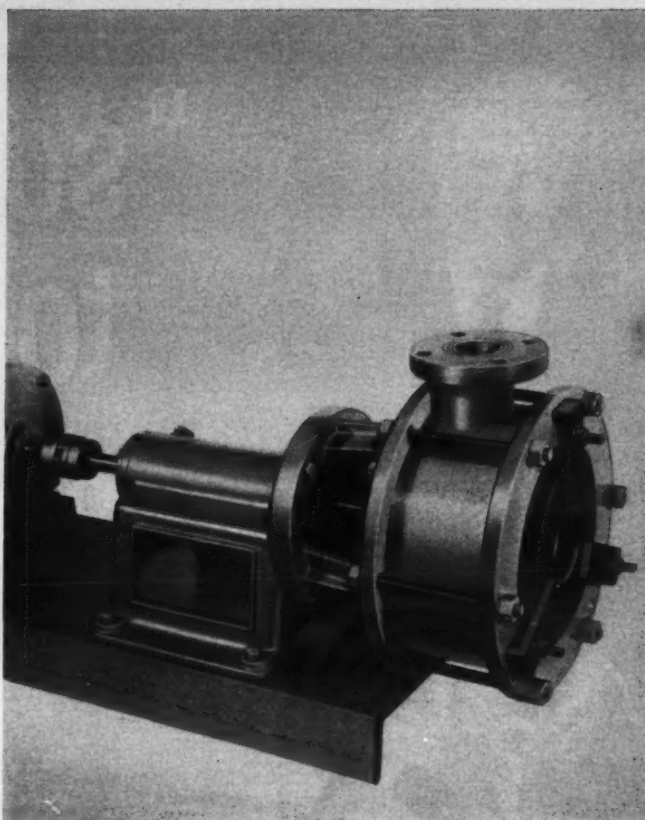
CHECK THESE RUGGED CONSTRUCTION FEATURES:

Cast iron frame gives rigid support and protection to heavy, sectioned PVC casing. **Molded, balanced-design impellers**—contoured vanes give maximum energy-transfer efficiency. **Low-friction roller bearings**, widely spaced to reduce loading, provide quiet operation. **Ample grease reservoir** prolongs bearing life. **Rigidity of construction**—this heavy-duty bearing pedestal can really take it! **Latest-design mechanical seals**—Fluid contacts only facings of rotating and stationary rings. Wide range of materials available cover virtually all corrosive applications. **Rotating rings** in DuPont Teflon or carbon. **Stationary rings** in ceramic or Stellite, reversible for additional use after extended periods of service.

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DIVISION OF COOPER ALLOY CORP., HILLSIDE, N. J.

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Check 3057 opposite last page

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**AUTOMATIC
CONTROLS**

- ELECTRONIC LIQUID LEVEL
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Check 3066 opposite last page

**PISTON
PACKING**

**PROBLEMS
SIMPLIFIED!**

Conventional and 45° bevel type Pumcups.

• The *right* piston packing for reciprocating pumps and cylinders goes a long way toward eliminating the problems of slippage, maintenance and down-time.

Because Darcova Pumcups are made in a complete range of sizes, various types, and in many texture-engineered compositions, they *fit* your temperature-pressure-fluid conditions. That's one important reason why they usually outlast other packing at least 3 to 1 while holding top efficiency to the last!

Why not get *all* the facts? Send today for Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

Pumcups

TRADE MARK

Check 3067 opposite last page

NEW LITERATURE

Removing sludge from chemicals, pharmaceuticals, oils and other products, by use of continuous centrifuges is discussed in eight-page bulletin. Operating cycle of automatic sludge discharge mechanism is pictured. Bul 2177—Centrico, Inc., 75 West Forest Ave., Englewood, N. J.

Check 3058 opposite last page.

Strip-chart recorder, containing 63' chart roll or 31-day's recording at one inch/hour, is depicted in Rusttrak Recorder Literature—Rust Industrial Co., Inc., 130 Silver St., Manchester, N. H.

Check 3059 opposite last page.

Lift-truck transmission—Four-page brochure covers design and performance of dual-range, hydraulically shifted, constant-mesh transmission with integral torque converter. Cutaway shows transmission components. Hystamatic Brochure—Hyster Company, 1003 Myers St., Danville, Ill.

Check 3060 opposite last page.

Fluid energy mill for grinding materials to micron-size powders is reviewed in four-page bulletin. Table listing grinding energy required for various size machines is also included. "The Jet Pulverizer"—The Jet Pulverizer Company, Route 73, Palmyra, N. J.

Check 3061 opposite last page.

Track wheels and rollers for all types of material handling equipment and rail-supported machinery are specified in Cat 34—The C.O. Bartlett & Snow Company, 6200 Harvard Ave., Cleveland 5, Ohio.

Check 3062 opposite last page.

Radiographic- and fluoroscopic-inspection ideas are presented in 12-page bulletin, including information and photographs of actual plant applications. Bul-I-1159—Picker X-Ray Corporation, 25 S. Broadway, White Plains, N.Y.

Check 3063 opposite last page.

Textile auxiliary products are detailed in 200-page catalog, including descriptive index and categorization of bulletin entries. Textile Auxiliaries Cat — Metro-Atlantic, Inc., Centredale 11, R. I.

Check 3064 opposite last page.

Fiber data and textile information are summarized in 76-page booklet. Fiber-property table, denier conversion tables, and textile bibliography are included in Textile Fiber Booklet — American Viscose Corporation, 1617 Pennsylvania Blvd., Philadelphia 3, Pa.

Check 3065 opposite last page.

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NEW LITERATURE

Polyethylene resins of low-molecular-weight non-emulsifiable type are delineated in 22-page brochure, including uses and application techniques. Epolene C and N Brochure—Chemicals Division, Eastman Chemical Products, Inc., Subsidiary of Eastman Kodak Company, Kingsport, Tenn.

Check 3068 opposite last page.

Atmospheric drum dryers are delineated in two-page bulletin which discusses applications, design, and operation of dryers. Bul 328-1—Goslin-Birmingham Manufacturing Co., Inc., P.O. Box 631, Birmingham, Ala.

Check 3069 opposite last page.

Magnets, which have optional face plates for abrasive, corrosive, or sanitary uses, are detailed in six-page Bul 73-UA—Eriez Manufacturing Company, Magnet Dr., Erie, Pa.

Check 3070 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Pumps and chemical faucets are tabulated in six types of literature. All-Chem, Centri-Chem, Chemical Faucets, Gearchem, Minilab, and Pumpmobile Literature — Eco Engineering Company, 12 New York Ave., Newark 1, N.J.

Check 3071 opposite last page.

Ball valves in bronze, aluminum, stainless steel, and carbon steel are covered in Product Data Sheets—Jamesbury Corp., 65 New St., Worcester, Mass.

Check 3072 opposite last page.

Bulk chemicals are outlined in Bulk Chemical Cat — Special Chemicals Department, Winthrop Laboratories, 1450 Broadway, New York, N. Y.

Check 3073 opposite last page.

Internal-pipe-insulation application methods are reported in four-page Insidline Bul—Insidline Division, Baldwin-Hill Co., 500 Breunig Ave., Trenton 2, N. J.

Check 3074 opposite last page.

Automatic colorimetric analyzers are dealt with in eight-page illustrated Bul 1156-1, which is available by letterhead request from Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pennsylvania.

CONTAINER LINING PROTECTION



For the shipment and storage of chemicals, acids, solvents, foods and other corrosive materials in steel pails and drums.

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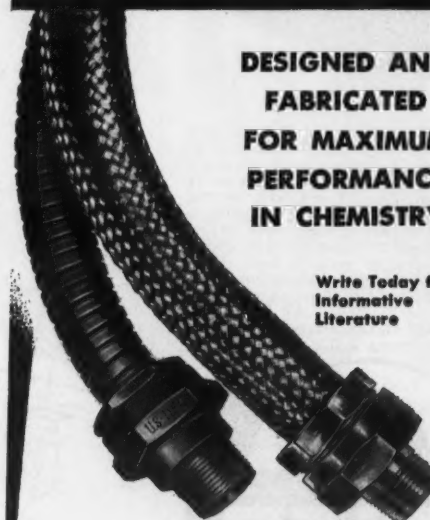
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Check 3075 opposite last page

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Check 3076 opposite last page

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ALL NEW
"Series 16" permanent
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MAGNETS
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Tests prove NEW "Series 16" magnets with greater magnetic strength stop tramp iron cold! New heavy duty aluminum cover increases rigidity, prevents pilferage and disassembly with subsequent loss of magnetic power. Choose from many models and strengths... optional face plates for abrasive, corrosive or sanitary uses; liquid or dust-tight applications. It's a fact: "Series 16" magnets, with 16 superior features, provide ultimate operating advantages at price of ordinary magnets!

GET 6-PAGE FACT-FILLED FOLDER. WRITE TO
 Eriez Mfg. Co., 73-UB Magnet Dr., Erie, Pa.



Check 3077 opposite last page

NEW LITERATURE

Duct fans which are belt-driven and feature adjustable driver sheaves for quick adjustment of fan speed are presented in illustrated, 12-page bulletin complete with dimensions, performance data, and construction details. Bul A-114A—Hartzell Propeller Fan Company, Division of Castle Hills Corp., Piqua, Ohio.

Check 3078 opposite last page.

Basic lead silico chromate is depicted in eight-page bulletin containing information on use as anti-corrosive pigment. Permox 1-4-3 Bul—Chemical Division, The Eagle-Picher Company, American Building, Cincinnati 1, Ohio.

Check 3079 opposite last page.

Depth gages for remote use in tanks are tabulated in eight-page bulletin. Specification tables and application illustrations are included in Bul 945—Uehling Instrument Co., Paterson, N.J.

Check 3080 opposite last page.

Crystallization procedures and equipment are thoroughly analyzed in 18-page, profusely illustrated booklet, "Crystallizers"—Chicago Bridge & Iron Company, 332 S. Michigan Ave., Chicago 4, Illinois.

Check 3081 opposite last page.

Floor patch for instantaneous use is subject of Instant-Use Brochure—Flexrock Company, 3611 Filbert St., Philadelphia 1, Pa.

Check 3082 opposite last page.

Welding fittings are detailed in catalog containing specification tables, photos, engineering drawings and ASA tables. Form 593—Dresser Manufacturing Division, Dresser Industries, Bradford, Pa.

Check 3083 opposite last page.

Centrifugal — performance and safety features are delineated in Descriptive Data Unit 2647—The Western States Machine Company, 1702 Fairgrove Ave., Hamilton, Ohio.

Check 3084 opposite last page.

Sulfur trioxide, its reactions and organic complexes, are considered in brochure. Reactions of Sulfur Trioxide — General Chemical Division, Allied Chemical Corporation, 40 Rector St., New York 6, New York.

Check 3085 opposite last page.

Industrial-product models are pictured in six-page brochure and are categorized as to uses. Product Model Brochure—Industrial Models, Inc. (Del.), 2311 Sconset Rd., Wilmington 3, Del.

Check 3086 opposite last page.

Pushbutton switches, in addition to lighted-display type, are summarized in 20-page catalog, incorporating split pages to permit comparison and selection of the various units. Cat 67 — Micro Switch, Division of Minneapolis-Honeywell Regulator Company, Freeport, Ill.

Check 3087 opposite last page.

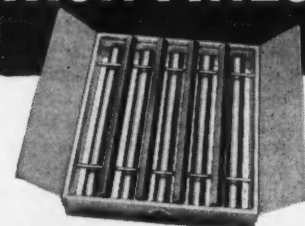


"And then I said, 'Harvey, if you think I'm going to marry you and wash clothes, floors, and dishes all my life...'"

ONLY ERIEZ

has a complete line of
 permanent non-electric
 GRATE MAGNETS
 designed to specifically

STOP
TRAMP IRON
 and
IRON FINES



ONLY ERIEZ Grate Magnets offer the widest selection of models, sizes and construction in the widest price range... either strong, proved-in-use ALNICO magnetic elements or new, low-cost CERAMIC material.

ONLY ERIEZ has units designed for your exact needs — with the most effective, most powerful magnetic fields — protected by U. S. and foreign patents.

ONLY ERIEZ — world's leading producer of magnetic equipment for industry — has the experience and know-how to provide the most effective Grate Magnets:

For tramp iron separation — Eriez Alnico-powered Grate Magnets proved stronger than all comparable units in extensive, controlled tests. Alnico is also highly effective for fine-iron separation.

For fine-iron separation — Eriez Ceramic Grate Magnets proved best for efficient, economical removal of fine-iron in free-flowing materials.

All Eriez Grate Magnets are non-electric, self-contained. Operate without any wires or attachments. Designed to prevent choking possibilities caused by bridging of iron and material accumulation. First cost is only cost. Ruggedly constructed; magnetic tubes permanently secured to frame, can't fall into flow line. No operating or maintenance costs. Available in: Wing-Type, Drawer-Type, Multiple-Bank, Rotary-Type, Odd-shaped Models, Housed Units, and Housed Vibratory Units.

Get all the facts... Write today
 Eriez Mfg. Co., 73-UB Magnet Dr., Erie, Pa.



Check 3088 opposite last page

CHEMICAL PROCESSING

NO LEAKAGE...

You're looking at the newest thing in valves...

STOCKHAM'S NEW WEDGEPLUG* "O-SEAL" VALVE

Two Teflon** "O" rings in the plug give constant vapor-tight shut-off... to give you double assurance of double savings on operating and maintenance costs.

NO LUBRICATION....

HOW TEFLON "O" RINGS WORK The two Teflon "O" rings are inserted in dovetail grooves machined on the face of the plug. These "O" rings seat on the raised body seats when the plug is in closed position.

CONSTANT VAPOR-TIGHT SHUT-OFF This sealing effect of the "O" rings gives absolute shut-off in all cases—shut-off that remains permanently "bubble tight." The Teflon "O" rings are chemically inert, practically frictionless, and will not cold flow.

TESTS PROVE POSITIVE SHUT-OFF

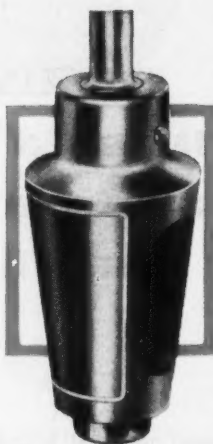
Hundreds of tests of this new valve in all types of services have failed to make it leak. Performance has been remarkable. In every case, the valve held "bubble tight" because of the pressure seal effect of the "O" rings.

OTHER OUTSTANDING ADVANTAGES

Non-Lubricated—no costly maintenance necessary • Provides Double-Block and Bleed in most services • Quick, Easy Operation—won't stick or bind • Double Seating for Double Safety—Ground metal-to-metal seat provides shut-off in case fire burns out "O" rings • No Product Contamination • Protected Seats

RECOMMENDED USAGES Stockham's new "O-Seal" is recommended for all general purposes—air, gas, water, steam, propane, hydrocarbons, etc., as well as for hard-to-hold services. Recommended for temperatures from minus 300°F to 400°F and not exceeding 720 psi.

Available in carbon and alloy steels, 2" - 12" sizes, 150 and 300 lb. pressures. Three port openings—40%, 70%, full round—wrench, handwheel, gear, and motor operated.



*Patented
**Teflon
DuPont Trademark



STOCKHAM'S NEW WEDGEPLUG "O-SEAL" VALVE



Call Your STOCKHAM Distributor or Sales Representative for complete details, or write today for the new brochure on the Wedgeplug "O-Seal."

Stockham makes a BETTER valve...for EVERY job!

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Whatever your production or
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resistant metals and materials.

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Easy to use selection
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INDUSTRIAL SPRAY NOZZLES
AND COOLING TOWERS

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Check 3090 opposite last page

NEW LITERATURE

Urethane elastomers, for industrial potting and encapsulating applications, are thoroughly explained in seven-page pamphlet, "Muthathane"—Mobay Chemical Company, 405 Lexington Ave., New York, N.Y.

Check 3091 opposite last page.

Canned pumps for handling problem fluids are explained in Request for Quote Data Sheets—Chem-pump Corporation, Buck and County Line Rds., Huntingdon Valley, Pa.

Check 3092 opposite last page.

Vibrating screen separators as used in forest products industries is topic of four-page, illustrated booklet. Typical applications in four companies are described. "Vibrating Screen Separators for Forest Products"—Southwestern Engineering Company, Dept S586, 4800 Santa Fe Avenue, Los Angeles 58, Calif.

Check 3093 opposite last page.

Surface active agent dissertation, along with sections on cationics, non-ionics, anionics, and special products, is incorporated in 24-page Surface Active Agents Cat—Onyx Oil & Chemical Co., Jersey City 2, N.J.

Check 3094 opposite last page.

Paint-paste formulation is discussed in 12-page booklet. Formulation and wet-grinding-techniques information is included in paint-paste monograph—The Patterson Foundry and Machine Company, Subsidiary of Ferro Corporation, East Liverpool, Ohio.

Check 3095 opposite last page.

Irradiation-center facilities, services, and potential applications are previewed in four-page Irradiation Center Bul—Radiation Dynamics, Inc., Westbury, L.I., New York.

Check 3096 opposite last page.

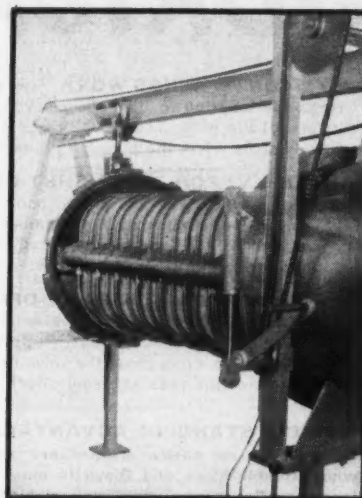
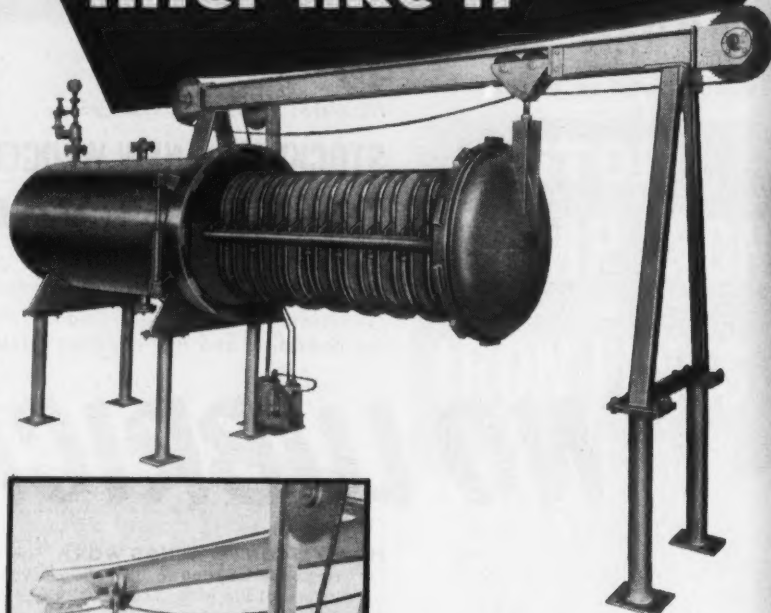
PE tetrastearate (the pentaerythritol ester of stearic acid) is treated in single-sheet Product Data Sheet 237 — Hercules Powder Company, Incorporated, Wilmington 99, Del.

Check 3097 opposite last page.

Engineering constants, tables, formulas, and other technical data are listed in 8-page brochure. Mixers and blenders are also reviewed in "Handy Reference Engineering Constants"—The Falcon Manufacturing Division of First Machinery Corp., 211 Tenth Street, Brooklyn 15, N. Y.

Check 3098 opposite last page.

No other pressure filter like it



SHRIVER takes a fresh approach to leaf filters

Here are new design features based on a well rounded 50-year knowledge of pressure filtration applications.

These illustrations, for example, show some novel and important improvements in leaf retraction mechanism and cake discharge, calculated to facilitate operation and cleaning.

Let us show you how the new Shriver filter improvements can help solve your filtration problems. Write for Bulletin 146.

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SLAB FORMERS • DIAPHRAGM PUMPS • ELECTROLYTIC CELLS

Check 3099 opposite last page

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SPECIFY
"VISCOMATIC"
LIME SLAKERS!

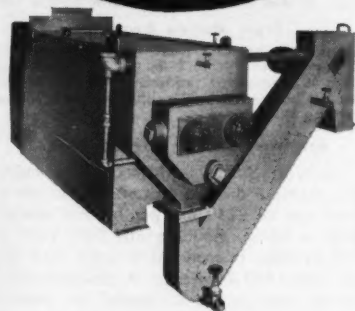
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has the EXPERIENCE
gained from the
manufacture and
installation of many...

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TORQUE
CONTROLLED**
constant viscosity
lime slakers

THE
VISCOMATIC®
SLAKER

slakes lime as a paste
with true pug mill action... slakes
fast with cold water to provide
maximum hydrate availability.



Torque actuated water controller
maintains uniform viscosity...
provides uniform strength slurry...
eliminates temperature controls, water
metering and insulation.

Write for INFILCO Bulletin 255. It
describes the "VISCOMATIC" Lime
Slaker and its utilization in water,
waste, and process applications.



INFILCO Inc. • TUCSON, ARIZONA

Check 3100 opposite last page

JULY 1959

NEW LITERATURE

Distribution equipment of low-voltage variety is specified in 84-page catalog, including selector charts for each product type, pictorial descriptions, pricing tables, and numerical listings. Cat GEC-1100 — Distribution Unit, General Electric Co., Plainville, Connecticut.

Check 3101 opposite last page.

Heat exchangers and thermal heaters of longitudinal finned-tube type are reviewed in 12-page bulletin, including process-application data, isometric cutaways, and exploded views of complete units. Bul FH-3-R — Alco Products, Inc., Box 1065, Schenectady 5, New York.

Check 3102 opposite last page.

Ball valves are subject of 38-page catalog which includes complete listing of various types. Flo-Ball Valve Cat—Hydromatics, Inc., 70 Okner Parkway, Livingston, N.J.

Check 3103 opposite last page.

ASTM activities for 1958 are summarized in a bulletin reprint. Particular attention is directed to work undertaken on problems related to radiation effects, high-temperature environments, nuclear-reactor materials, and similar items. Bul 235 Reprint—American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Check 3104 opposite last page.

Sulfuric anhydride is covered along with description of physical and chemical properties, handling and disposal procedures, plus other technical data in brochure, Sulfan—General Chemical Division, Allied Chemical Corporation, 40 Rector St., New York 6, N. Y.

Check 3105 opposite last page.

Conveyors—Gravity and live roller conveyors, wheel conveyors, and mobile belt conveyors are treated in 24-page bulletin. Components for these conveyors are also discussed. Bul 65—Standard Conveyor Co., North St. Paul 9, Minnesota.

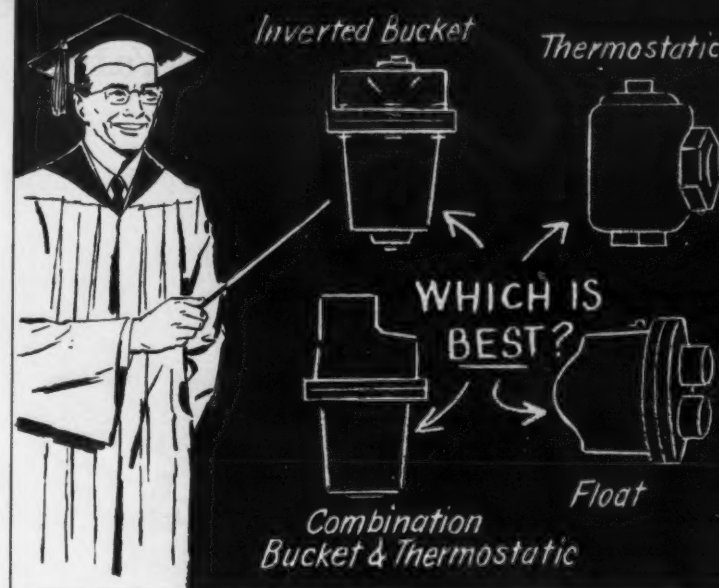
Check 3106 opposite last page.

History of aluminum is summarized by 26-minute film in sound and color. Picture reviews the industry's past, present, and future. "A Product of the Imagination"—Motion Picture Section, Aluminum Company of America, 1501 Alcoa Building, Pittsburgh 19, Pa.

Mixers of made-to-order type are presented in Cat V-1—Paul O. Abbe, Inc., 402 Center Ave., Little Falls, N. J.

Check 3107 opposite last page.

STEAM TRAP CHALK TALK #3



Is one trap design better than another?

- The steam trap user is often confused by the fact that there are four different designs of traps on the market. Is one better than another, and if so, which one should he use?

Actually, each design of trap has its place, *depending upon the application*. For example, thermostatic traps are preferred for chemical, petroleum and other outdoor applications because they cannot freeze. However, they do not compare in efficiency with inverted bucket traps for normal inside use. Where fast heating up is required, the combination bucket and thermostatic trap permits steam units to reach maximum heat $2\frac{1}{2}$ times faster. For continuous service, float traps are best.

For sound recommendations, ask Anderson. Manufacturing a complete line of traps, in all designs, they give unbiased counsel. Their engineering catalog, "How to Select Steam Traps and Other Fluid Specialties" contains hundreds of worthwhile recommendations. Mail coupon for your copy today.

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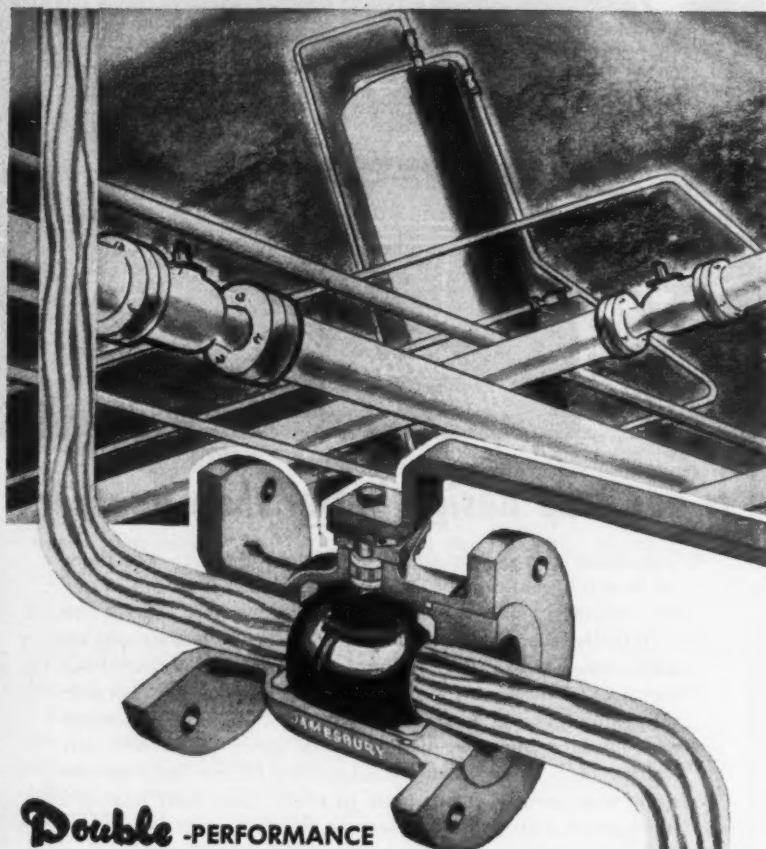
ANDERSON SUPER-SILVERTOPS

Check 3108 opposite last page

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Give Double-Value



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Wherever the Jamesbury "Double-Seal" principle is employed in its multiple industrial applications, "Superior performance" is the phrase heard everywhere.

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Check 3109 opposite last page

NEW LITERATURE

Water tube boilers, available in range of 20 to 200 hp, and with capabilities of 670,000 to 6,690,000 Btu, are discussed in Buls 475 and 586—Vapor Heating Corporation, 80 E. Jackson Blvd., Chicago 4, Illinois.

Check 3110 opposite last page.

Adjustable-speed drives are summarized in six-page bulletin. Dimensions, engineering information, and cutaway view are included in Bul 2750—The Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.

Check 3111 opposite last page.

Homogenizers, colloid mills, and dispersers are presented in Buls H-55 and LH-55 (homogenizers), C-57 (colloid mills), and SMD-55 (dispersers) — Manton Gaulin Manufacturing Co., Inc., 55 Garden St., Everett 49, Mass.

Check 3112 opposite last page.

Chemicals, suggested as intermediates in preparation of chelating agents, pharmaceuticals, insecticides, and metal deactivators, among others, are listed in Chemical Cat — The Ames Laboratories, Inc., 132 Water St., South Norwalk, Conn.

Check 3113 opposite last page.

Ribbon Blenders are reviewed in eight-page bulletin. Mixers for powders, pastes, and liquids, in addition to those for corrosive materials, are also covered in Bul 800-159—The J. H. Day Company, Division of The Cleveland Automatic Machine Company, 4932 Beech St., Cincinnati 12, Ohio.

Check 3114 opposite last page.

Isopropyl chloroformate properties and characteristics are considered in Isopropyl Chloroformate Tech Bul — Columbia-Southern Chemical Corporation, Subsidiary of Pittsburgh Plate Glass Company, One Gateway Center, Pittsburgh 22, Pa.

Check 3115 opposite last page.

Flexible-hose connectors, fittings, and adapters are considered in 16-page Bul TC-101—American Metal Hose Division, The American Brass Company, Waterbury 20, Conn.

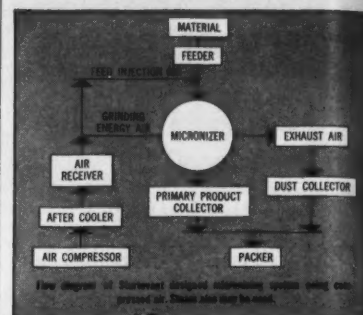
Check 3116 opposite last page.

Centrifugal-air-separation formulas are tabulated in Air Separation Booklet—Rupert M. Gay Division, Universal Road Machinery Co., 117 Liberty St., New York 6, New York.

Check 3117 opposite last page.

Need 1/2 to 44 Microns?

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Make 325 Mesh Obsolete



One Operation Reduces, Classifies

Sturtevant Micronizers grind and classify in one operation in a single chamber—provide fines in range from 1/2 to 44 microns to meet today's increased product fineness needs. Can handle heat-sensitive materials.

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Check 3118 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Bench scales for heavy use are fully described and illustrated in brochure. Bench Scale Literature—Detecto Scales, Inc., 540 Park Ave., Brooklyn 5, N.Y.

Check 3119 opposite last page.

Magnetic-tape recorder for instruments is reported in eight-page bulletin, including complete specifications. Bul 55—Precision Instrument Co., 1011 Commercial St., San Carlos, Calif.

Check 3120 opposite last page.

Air-handling applications for flexible hose are subject of 14-page Bul 83—The Flexaust Company, Division of Callahan Zinc-Lead Company, Inc., 100 Park Ave., New York 17, N.Y.

Check 3121 opposite last page.

Mixing equipment, including vibrating screens and units for impact milling and particle-size reduction, is depicted in three booklets. Impact Milling, Particle Size Reduction, and Vibrating Screen Booklets—Entoletter, Division of Safety Industries, Inc., Box 904, New Haven, Conn.

Check 3122 opposite last page.

Liquid-level controls and indicators are tabulated in four-page bulletin. Photographs and descriptive information is incorporated in Bul A—Petrometer Corporation, 43-22 Tenth St., Long Island City 1, N.Y.

Check 3123 opposite last page.

Sodium phosphate products are outlined in a technical bulletin which includes use-reference guide. Sodium Phosphate Tech Bul—Inorganic Chemicals Division, Monsanto Chemical Company, 800 N. Lindbergh Blvd., St. Louis 66, Mo.

Check 3124 opposite last page.

Belt-conveyor products are shown in 88-page catalog which includes an engineering data section with simplified and condensed information to aid selection. Included are idlers, take-ups, pulleys, brushes and scrapers, pillow blocks, feeders. Cat ID-591—Industrial Division, Materials Handling Department, Continental Gin Company, Birmingham 2, Alabama.

Check 3125 opposite last page.

Urethane foaming resins are reported on in three bulletins which discuss physical properties of resin, need for and application of release agents, and catalysts for use with resin. Buls R-112-1, R-112-2, and R-112-3—Thiokol Chemical Corporation, Trenton 7, N. J.

Check 3126 opposite last page.

WHO SWIPED PAGE

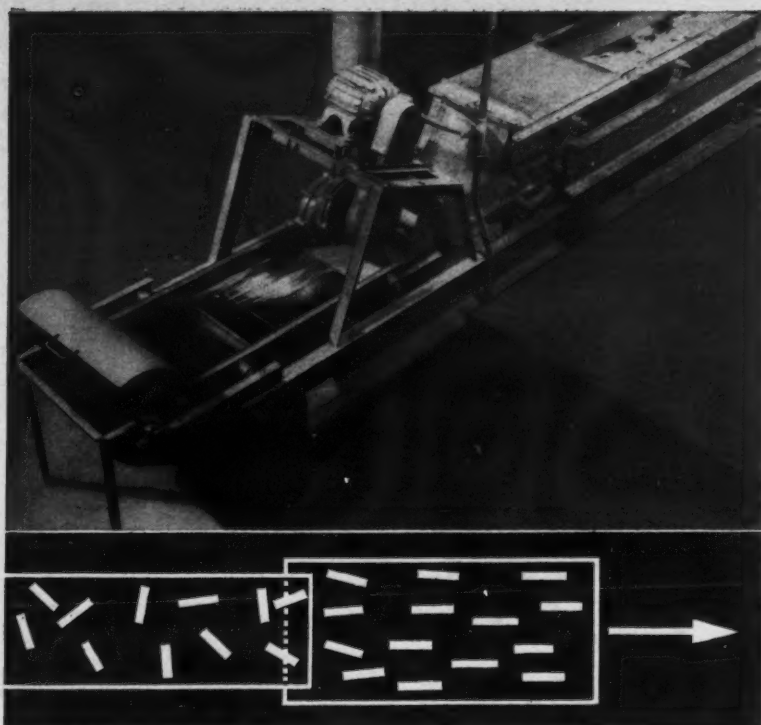
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Please send Ajax Lo-Veyor Selection Guide to

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Concern _____

Address _____

Check 3127 opposite last page

NEW LITERATURE

Induced-draft fans are listed along with photos, drawings, charts of ratings, and specifications in 16-page catalog. Ordering procedures are also covered. Bul L-3—Lehigh Fan & Blower Division, Fuller Company, Subsidiary of General American Transportation Corporation, Catasauqua, Pa.

Check 3128 opposite last page.

Pressure, vacuum gages are treated in 32-page catalog. Complete descriptions of all types in line are incorporated in Cat 525B—Weksler Instrument Corporation, 195 East Merrick Road, Freeport, L.I., N.Y.

Check 3129 opposite last page.

Esters—Properties and applications of 26 different esters form basis of 48-page booklet, "Esters"—Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 East 42nd St., New York 17, N.Y.

Check 3130 opposite last page.

Strapping tools and associated items are outlined in 51-page manual, including detailed application data and tables. Insulation Manual—A. J. Gerrard & Company, 1950 Hawthorne Ave., Melrose Park, Ill.

Check 3131 opposite last page.

Platecoil applications, such as tank and process heating and cooling, heat recovery, and oven and furnace uses, are pictured and explained in 8-page Bul PD-1—Platecoil Division, Tranter Manufacturing, Inc., Lansing 9, Mich.

Check 3132 opposite last page.

Rolling steel doors, grilles, and shutters are classified in 16-page Bul G-59—Rolling Steel Door Division, The R. C. Mahon Company, East 8-Mile Road, Detroit 34, Mich.

Check 3133 opposite last page.

Expansion-joint line of packless corrugated type is reported in four-page bulletin, incorporating application data. Expansion Joint Bul—Zallea Brothers, 815 Locust St., Wilmington 99, Del.

Check 3134 opposite last page.

Nuclear-reactor information is contained in 297-page book. Detailed information on 95 reactors in U.S., Canada, South America, Western Europe, and Asia is included in "Research and Test Reactors," which is available from Order Department of The American Society of Mechanical Engineers, 29 West 39th Street, New York 18, N.Y., for \$7.50.

Fire extinguishers and accessories are pictured in Fire Extinguisher Brochure—American LaFrance Corporation, Elmira, N.Y.

Check 3135 opposite last page.

Pneumatic conveying systems, positive pressure, are depicted in four-page technical bulletin. Major components are discussed, and photos are shown of installations. A chart helps determine horsepower and line-size requirements. Bul 208—Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 3136 opposite last page.

Laboratory baths for variety of purposes are previewed in eight-page Bul 1285—Chicago Apparatus Company, 1735 N. Ashland Ave., Chicago 22, Ill.

Check 3137 opposite last page.

Muriatic acid data on production, uses, and properties, including instructions for mixing, dilution, safety precautions, storage and handling, and analytical procedures, are all summarized in 40-page Muriatic Acid Brochure—Stauffer Chemical Company, 380 Madison Ave., New York 17, New York.

Check 3138 opposite last page.

Combination drying, blending, and sterilizing equipment using inerted ethylene oxide gas as sterilizing medium, is described in 4-page bulletin. Series of 12 drawings describe unit's theory of operation. Bul 200—Wilmet Castle Co., 1932 East Henrietta Road, Rochester, New York.

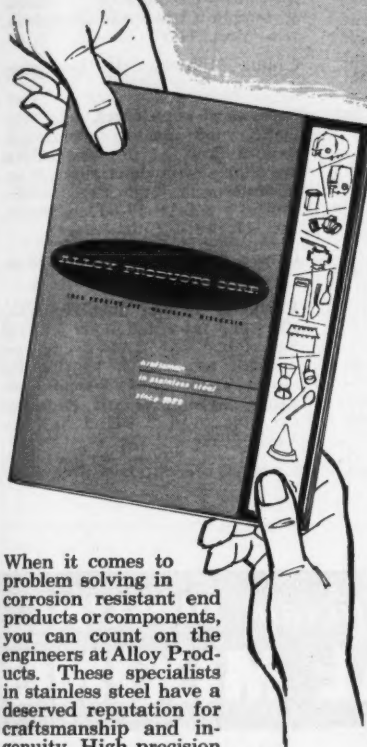
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Check 3140 opposite last page

JULY 1959

NEW LITERATURE

Lift trucks ranging from 2000-lb to 10,000-lb capacity have complete specifications tabulated in four-page Folder BU-302A — Engine-Material Handling Division, Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis.

Check 3141 opposite last page.

Plug valves, their uses, and suggested lubricants are cited in 28-page and 16-page booklets. Latter contains nine pages of tables of lubricants. Reference Book 39—Sec. 1 and 1A—Homestead Valve Manufacturing Co., Coraopolis, Pennsylvania.

Check 3142 opposite last page.

Filter-fabric firm's products, services, and facilities are recorded in eight-page bulletin. Information on cloth analysis is included, in addition to listing of fabrics in stock, in Bul T 1-59—Technical Fabricators, Inc., 136 Washington Ave., Nutley, N.J.

Check 3143 opposite last page.

Polyethylene bag for heavy-duty industrial packaging has its various features discussed in four-page bulletin. Typical products benefiting from use of the bags are listed. "The Heavy-duty Industrial Bag"—Chippewa Plastics, Inc., Chippewa Falls, Wisconsin.

Check 3144 opposite last page.

Spectrophotometry is topic discussed in a bulletin which lists detection limits and useful wave lengths for determining more than 70 elements. Bul 753—Beckman/Scientific and Process Instruments Division, 2500 Fullerton Rd., Fullerton, Calif.

Check 3145 opposite last page.

Centrifugal pumps, of both closed and open-impeller types, are outlined in Bul 107—Frederick Iron and Steel, Inc., Frederick, Md.

Check 3146 opposite last page.

Heat exchanger specifications, based on utilization of single modular hairpin unit for all duties, are spelled out in nine-page Specification M-100—Brown Fintube Company, Elyria, Ohio.

Check 3147 opposite last page.

Technical report writing, from a viewpoint of scientists, engineers, and technicians, is fully discussed in 54-page manual. Principles and procedures involved are covered, in addition to mechanics of presentation, grammar, and suggestions and hints on semantics and syntax. "How To Organize And Write A Technical Report" is available from Owens - Illinois Glass Company, Toledo 1, Ohio.

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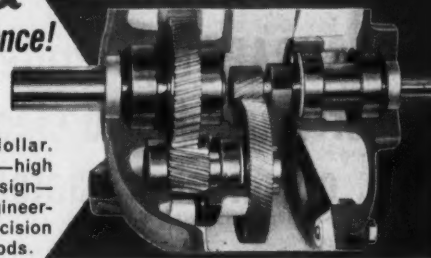
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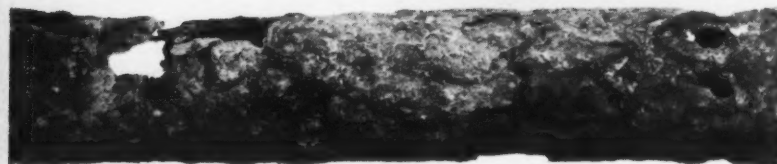
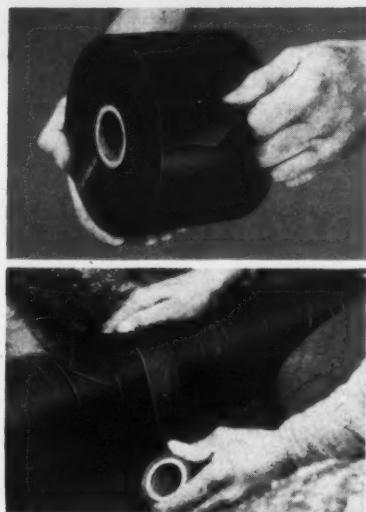
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Check 3149 opposite last page

NEW LITERATURE

Fire pumps of both standard and low-pressure type are fully delineated in two bulletins. Pump components are completely outlined and described in Bul 08B8551 and Bul 08B9032—Allis-Chalmers Manufacturing Company, 864 S. 70th St., Milwaukee 1, Wis.

Check 3151 opposite last page.

Lubrication of roller and silent chain drives is explained with photos, drawings, tables, and graph in four-page bulletin. Bul 54—Industrial Products Department, Sun Oil Company, 1608 Walnut St., Philadelphia 3, Pa.

Check 3152 opposite last page.

Labeled isotopic compounds are listed in 24-page Labeled Compound Cat, which is available on letterhead request from Volk Radiochemical Company, 5412 North Clark St., Chicago 40, Ill.

Particle size distribution analyzer is pictured in 10-page Bul 101—The Sharples Corporation Research Laboratories, 424 W. 4th St., Bridgeport, Pa.

Check 3153 opposite last page.

Laboratory sifters are covered in single-page leaflet, incorporating technical data and drawings. Bul 138-B—Sprout, Waldron & Co., Inc., Muncy, Pa.

Check 3154 opposite last page.

How to use Teflon sheets, rods, tubes, tape, and other standard shapes, is explained in Teflon Brochure—Commercial Plastics & Supply Corp., 630 Broadway, New York, N.Y.

Check 3155 opposite last page.

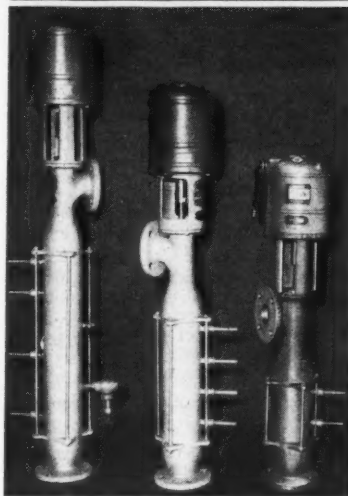
Superspeed centrifuges, one automatic, other enclosed, plus continuous flow system, and cabinet are shown with description of applications in eight-page folder. Bul SS-3-4/BAF-59—Ivan Sorvall, Inc., Norwalk, Conn.

Check 3156 opposite last page.

Polyvinyl alcohol fiber characteristics and information on mill and wet processing and dyeing are outlined in six-page Vinylon Bul—Air Reduction Chemical Company, Division of Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y.

Check 3157 opposite last page.

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Check 3150 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Centralized lubrication—Advantages over manual methods, economies to be realized, and steps for converting to automatic systems are delineated in 16-page brochure. "A Report to Management"—Industrial Division, Lincoln Engineering Co., Division of The McNeil Machine and Engineering Co., 4010 Goodfellow Rd., St. Louis 20, Mo.

Check 3158 opposite last page.

Laboratory apparatus is previewed in 16-page catalog, Apparatus Review 9—Arthur S. LaPine & Company, 6001 S. Knox Ave., Chicago 29, Ill.

Check 3159 opposite last page.

Air-control valves are cataloged in a 13-page bulletin. Discussion of air-valves selection is incorporated into Bul 234—Hannifin Company, Division of Parker-Hannifin Corporation, 501 S. Wolf Road, Des Plaines, Ill.

Check 3160 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Helical gear motors are explained in illustrated 16-page Bul GEA-6704—Gear Motor and Transmission Components Department, General Electric Company, Schenectady 5, N.Y.

Check 3161 opposite last page.

Color Dispersant, for use in preparing tinting colors is treated in two-page Kromosperse Data Sheet—Nuodex Products Company, Division of Heyden Newport Chemical Corporation, Elizabeth, New Jersey.

Check 3162 opposite last page.

Automatic filters for continuous filtration of water-soluble coolants for machine tools and other equipment are discussed in four-page bulletin. Bul FB-103—U. S. Hoffman Machinery Corp., Industrial Filtration Division, Thompson Road Plant, Syracuse, N. Y.

Check 3163 opposite last page.

Walkie-truck application is discussed in four-page folder that tells how to pick the best type for given job. Information on special attachments and specially designed trucks is included. "Walkies—What They Can and Can't Do"—Moto-Truc Company, 1954 E. 59th St., Cleveland 3, Ohio.

Check 3164 opposite last page.

Drafting equipment and supplies are presented in 100-page Drafting equipment Cat—Alfred Mossner Company, 108 W. Lake St., Chicago 1, Ill.

Check 3165 opposite last page.

Multi-purpose conveyor for use in plating, anodizing, painting, phosphatizing, and rubber-dipping operations is covered in four-page Bul MP—Crown Rheostat and Supply Company, 1965 Pratt Blvd., Elk Grove Village, Ill.

Check 3166 opposite last page.

Fluorescent chemicals and plastic scintillators are outlined in four-page Bul 591—Pilot Chemicals, Inc., 36 Pleasant St., Watertown 72, Mass.

Check 3167 opposite last page.

Mass spectrometer working principles, applications, and analytical procedures are incorporated in 15-page Bul 1800E—Analytical & Control Instrument Division, Consolidated Electrodynamics Corporation, 300 N. Sierra Madre Villa, Pasadena, Calif.

Check 3168 opposite last page.

Ring balance meter applications are included in eight-page Bul MSP-160—Hagan Chemicals & Controls, Inc., Route 60 at Campbell Run Rd., Box 1346, Pittsburgh 30, Pa.

Check 3169 opposite last page.

Vial fillers for dispensing liquids in controlled doses, plus accessories, are shown along with data on use and specifications in eight-page "Vial Fillers"—National Instrument Co., 4119-4127 Ford-leigh Rd., Baltimore 15, Md.

Check 3170 opposite last page.

Vacuum pump is previewed in 16-page catalog. Specifications, volumetric efficiency, capacity-curves, and other operational characteristics are incorporated in Cat 90—Beach-Russ Company, 420 Lexington Ave., New York 17, N. Y.

Check 3171 opposite last page.

Dewar flasks, including those especially designed for cryogenic research, are presented in 54-page Dewar Flask Cat—H. S. Martin & Son, 1916 Greenleaf St., Evanston, Ill.

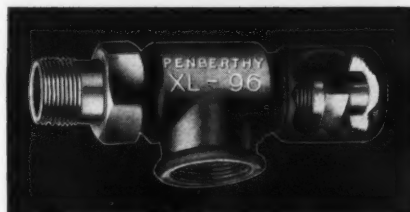
Check 3172 opposite last page.

Stainless pipe, tube are specified in eight-page Bul U—Union Steel Corporation, Union, N.J.

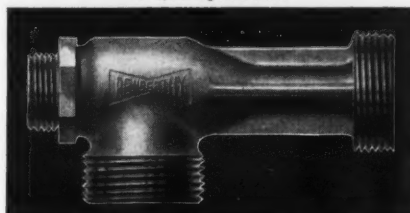
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fluids, vapors, gases...*

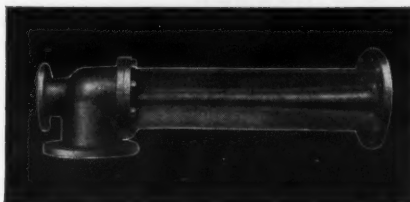
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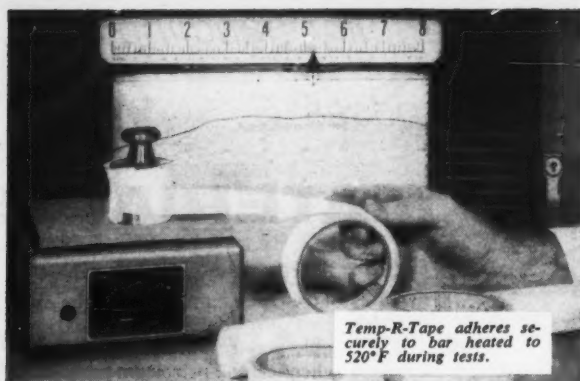
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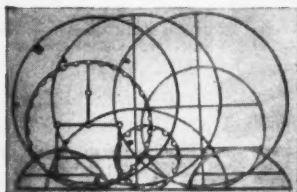
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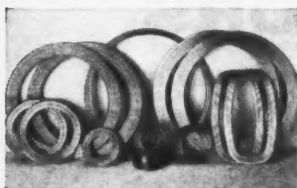
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Chicago 19, Illinois

Check 3176 opposite last page

NEW LITERATURE

Packaged automatic boilers, oil-fired, gas-fired, and combination gas/oil systems, are introduced with photos, tables, diagrams and explanations in eight-page Bul 1250—Orr & Sembower, Inc., Morgantown Rd., Reading, Pa.

Check 3177 opposite last page.

Stencil and sealing equipment for shipping departments is cataloged in 24-page Cat M-60—Marsh Stencil Machine Company, Belleville, Ill.

Check 3178 opposite last page.

Liquid-level controls and controls for liquid flows are topic of 24-page bulletin, which consists of specialized application information. Bul ERS-A—McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18, Ill.

Check 3179 opposite last page.

Lever-operated-hoist handling in a safe manner is subject treated in Hoist Handling Safety Chart—Manning, Maxwell & Moore, Incorporated, Muskegon, Mich.

Check 3180 opposite last page.

Voltage starters for squirrel-cage, wound-rotor, and synchronous motors in both air-break and oil-break forms are cataloged in eight-page Bul 8130 — The Electric Controller & Mfg. Co., Division of Square D Company, 4500 Lee Rd., Cleveland 28, Ohio.

Check 3181 opposite last page.

Laboratory fume hoods are described in 26-page catalog, which includes application information and discussion of operational principles. Cat DH3—Duralab Equipment Corp., 979-995 Linwood St., Brooklyn 8, N.Y.

Check 3182 opposite last page.

Electrical connectors are illustrated, applications and arrangements given in 12-page catalog. Cat B 73—Electrical Products Division, Joy Manufacturing Co., 1241 Mackind Ave., St. Louis 10, Missouri.

Check 3183 opposite last page.

Yttrium properties are tabulated on single-page Cat Sheet 111—Research Chemicals, Division of Nuclear Corporation Of America, Box 431, 170 W. Providencia St., Burbank, Calif.

Check 3184 opposite last page.

Pumps are topic of Buls HX-57 and P-55 — Manton Gaulin Manufacturing Co., Inc., 55 Garden St., Everett 49, Mass.

Check 3185 opposite last page.

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NEW CATALOG 2008 gives details on these and other models — includes manometer liquids and accessories — explains basic principles. Write —



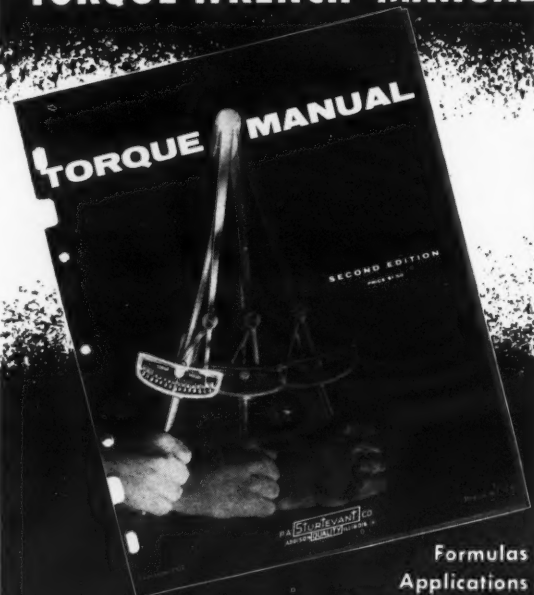
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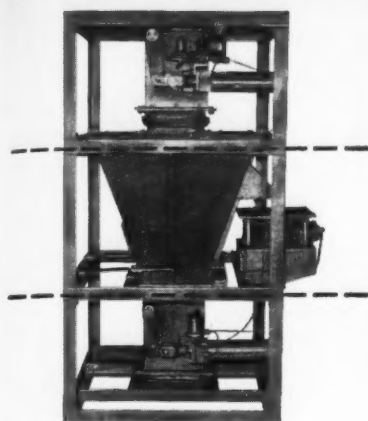
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Check 3188 opposite last page

JULY 1959

NEW LITERATURE

Safety release valves are analyzed in 84-page catalog, which incorporates extensive engineering charts and data, and valve-discharge capacity tables for liquids, air, gas, and steam. Cat 88—Marine & Industrial Products Co., North Wales, Pa.

Check 3189 opposite last page.

Pallet boxes designed for easy assembly, disassembly, and reuse are depicted in two-page Bul TC-59—General Box Company, 1825 Miner St., Des Plaines, Ill.

Check 3190 opposite last page.

Electric hoists featuring low headroom requirements are depicted along with engineering data in 12-page Bul H-113—Northern Engineering Works, 210 Chene St., Detroit 7, Mich.

Check 3191 opposite last page.

Sodium formate products specifications, typical properties, outstanding characteristics, and uses are incorporated in eight-page Sodium Formate Booklet—Heyden Chemical Division, Heyden Newport Chemical Corporation, 342 Madison Ave., New York 17, New York.

Check 3192 opposite last page.

Tolylene diisocyanate safe-handling practices are topics presented in a safety data sheet. Copies of Bul SD-73 are available at 30 cents each from Manufacturing Chemists' Association, 1825 Connecticut Ave., N.W., Washington 9, D. C.

Giant fork truck with 30-ton capacity, automatic safety features, fluid drive, and power steering is presented in Bul 725—Silent Hoist & Crane Co., 841-877 63rd St., Brooklyn 20, N. Y.

Check 3193 opposite last page.

Paper chromatography and electrophoresis is outlined in 68-page Paper chromatography Cat—Research Specialties Co., 200 S. Garrard Blvd., Richmond, Calif.

Check 3194 opposite last page.

Packless expansion joints are subject of detailed treatment in 72-page Bul. 59-50—Adscor Division, Yuba Consolidated Industries, Inc., 20 Milburn St., Buffalo 12, N.Y.

Check 3195 opposite last page.

Galvanometers are outlined in six-page Galvanometer Folder—The Ealing Corporation, Affiliate of Baird-Atomic, 40 University Rd., Cambridge 38, Mass.

Check 3196 opposite last page.

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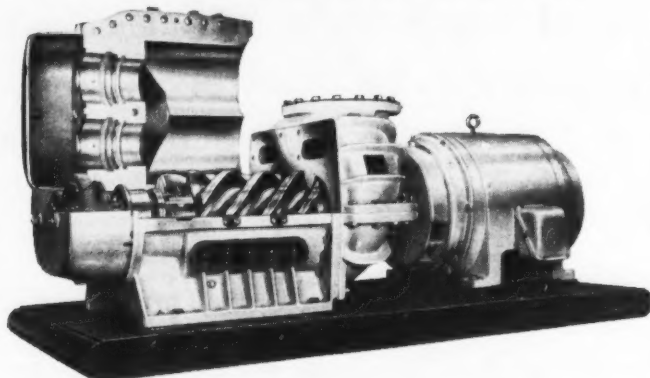
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Check 3198 opposite last page

NEW LITERATURE

Vacuum pumps are described in four-page bulletin which includes diagrams and photographs. Bul 5H-HS—Schutte and Koerting Company, Cornwells Heights, Bucks County, Pa.

Check 3199 opposite last page.

Pneumatic transmitter for rate of flow, loss of head, and liquid level measurement is explained in four-page Bul 285.20A-1—B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R.I.

Check 3200 opposite last page.

Clutch-pulley package is depicted in 10-page Brochure WEB P-52—Warner Electric Brake & Clutch Company, Beloit, Wis.

Check 3201 opposite last page.

Thermocouple wire, categorized with respect to gauge, type, color coding, and insulation, is tabulated in four-page Thermocouple Wire Cat—Harco Laboratories, Inc., 77 Olive St., New Haven, Conn.

Check 3202 opposite last page.

Fiber lubricant data concerning static control, scourability, resistance to yellowing, and light and storage stability, are contained in Tech Bul 414—Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio.

Check 3203 opposite last page.

Various valves for liquid and gas handling systems, as well as accumulators, filters, and strainers, are cataloged in 12-page, indexed booklet. Bul C-591—Koehler Aircraft Products Co., subsidiary of New Britain Machine Co., 409 Leo St., Dayton, Ohio.

Check 3204 opposite last page.

Liquid-handling equipment, including pumps, mixers, and filters, is covered in bulletin. Application tables and charts illustrating flow rate and filtration area are also included. Bul 58—Ertel Engineering Corp., Kingston, N. Y.

Check 3205 opposite last page.

Polystyrenes of normal and modified types are presented in 24-page Tech Bul C-9-231—Plastics Division, Koppers Company, Inc., 801 Koppers Bldg., Pittsburgh 19, Pennsylvania.

Check 3206 opposite last page.

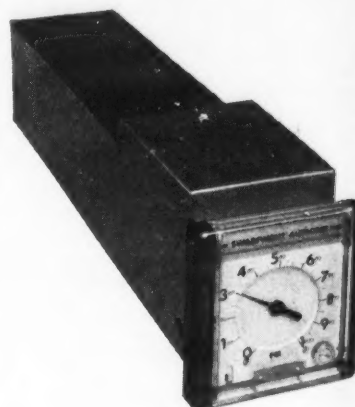
Pipe, vessel covering application for low-temperature insulation are contents of 12-page Bul 157-57—The Dow Chemical Company, Midland, Mich.

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CHEMICAL PROCESSING

NEW LITERATURE

Sanitary maintenance systems for factories and office buildings are explained in 20-page "Engineered Maintenance"—Puritan Chemical Company, 916 Ashby St., N.W., Atlanta 18, Georgia.

Check 3209 opposite last page.

Aluminum silicate pigments' properties are depicted in four-page Technical Information 1001—Minerals & Chemicals Corporation of America, Menlo Park, New Jersey.

Check 3210 opposite last page.

Fluid-control equipment in operation is depicted in 16-mm color film. Cavitation, turbulence, and effects of corrosion are shown in 25-minute movie, "Muscles of Control" film—Fisher Governor Company, Marshalltown, Iowa.

Check 3211 opposite last page.

Heating-cooling elements, of embossed-plate design, are topic of four-page Bul 259—Dean Thermo-Panel Coil, Division of Dean Products, Inc., 616 Franklin Ave., Brooklyn 38, N. Y.

Check 3212 opposite last page.

Motor reducer descriptions and extensive engineering application data are incorporated into 28-page Bul 3100—The Falk Corporation, 3001 W. Canal St., Box 492, Milwaukee 1, Wis.

Check 3213 opposite last page.

Pneumatic conveyor systems for low-cost transfer of wet or dry fluid materials are described in four-page Bul 1001—Vac-U-Max Corporation, One Montgomery St., Belleville 9, N. J.

Check 3214 opposite last page.



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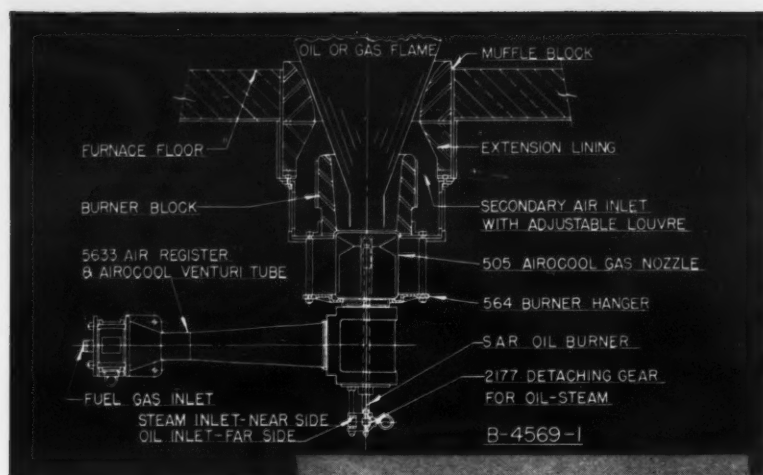


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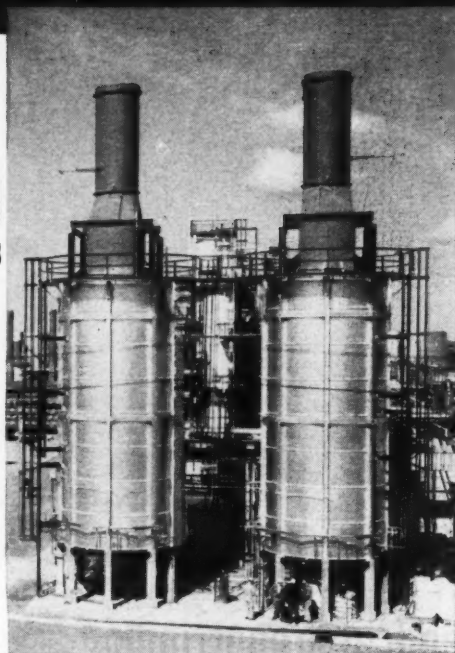
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Check 3216 opposite last page

NEW LITERATURE

Sludge pump, of vertical non-clogging top-suction type, is presented in Bul 206-4—Lawrence Pumps Inc., 371 Market St., Lawrence, Massachusetts.

Check 3217 opposite last page.

Gas analyzers for evaluating thermal conductivity method and developing sampling systems are pictured, parts listed, and uses explained in four-page brochure. Bul GMH 1-59-1500—Gow-Mac Instrument Company, 100 Kings Rd., Madison, N.J.

Check 3218 opposite last page.

Control valves of split-body air-operated type are delineated in eight-page bulletin, which includes diagrams and photographs. Bul 117—Uniflow Valve Corporation, Cranford, N. J.

Check 3219 opposite last page.

Corrugated packaging is subject of 32-page, profusely illustrated book. First of two sections deals with basic corrugated box designs; the other to special corrugated box designs. Photo-caption method is used to point up which box is suitable for which application. "How To Pack It"—Hinde & Dauch Division, West Virginia Pulp and Paper Company, Sandusky, Ohio.

Check 3220 opposite last page.

Battery chargers which are vertically mounted to reduce floor-space needs by two-thirds are shown in four-page Form 6259—Exide Industrial Division, The Electric Storage Battery Company, Rising Sun and Adams Ave., Philadelphia 20, Pa.

Check 3221 opposite last page.

Ferrocene or dicyclopentadienyliron characteristics and specifications are incorporated into two-page Ferrocene Bul—Matheson Coleman & Bell, Division of The Matheson Company, Inc., Norwood 12, Ohio.

Check 3222 opposite last page.

Rolling doors of all types are cataloged in 36-page bulletin, incorporating photos, specifications, and drawings. Bul 101—Kinnear Manufacturing Company, Columbus, Ohio.

Check 3223 opposite last page.

Fire extinguisher guide is six-page folder containing table which lists characteristics of various types of extinguishers. Fire Extinguisher Guide—Fire Equipment Division, Ansul Chemical Company, Marinette, Wis.

Check 3224 opposite last page.

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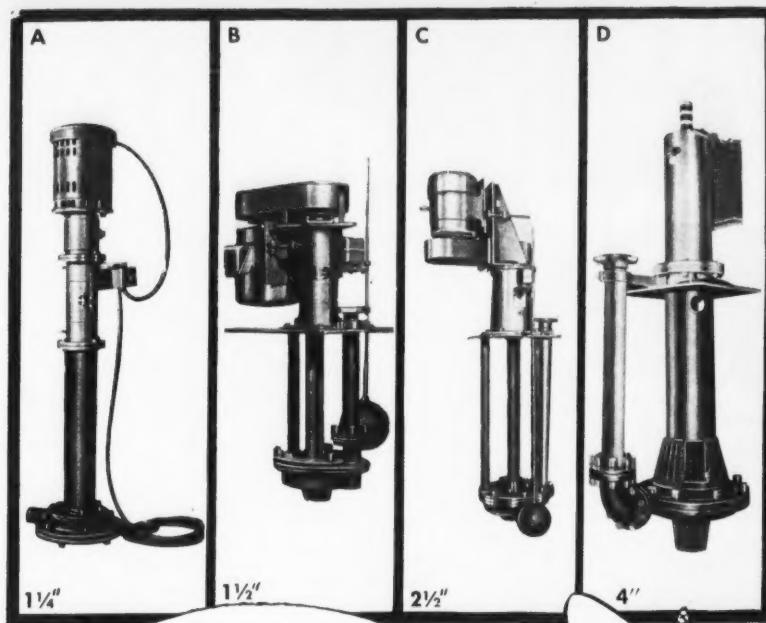
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 SAN FRANCISCO 8, 355 Stockton Street, YUkon 2-9537, Bob Wettstein & Associates, Jerry Nowell, Gene R. Watts
 ST. LOUIS, 515 Newport Avenue, Webster Groves, Mo., WOODland 2-4384, Donald F. Maguire, District Manager
 SOUTHEASTERN STATES, 40 Peachtree Place, N. W., Atlanta 9, Ga. TRinity 2-2235, Joe H. Howell

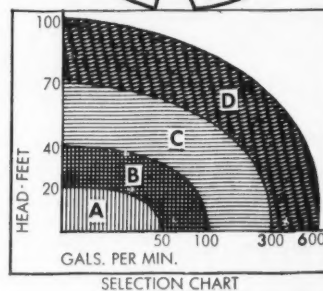
JULY 1959



WHAT A LINE-UP!
I'VE PUMPED 'EM . . . GIVEN
'EM THE THIRD DEGREE . . .
AND STILL THEY WON'T
BREAK DOWN!

GALIGHER ACID-PROOF SUMP PUMPS

are built to eliminate common causes of pump failure. Galigher pumps have no troublesome submerged bearings, no mechanical seals or packing, and their double-suction thrustless design prevents air lock. Ideal for heavy duty corrosive service prevalent in the chemical industry, a Galigher pump handles highly abrasive, 60% solid slurries effectively. In four production models plus custom designs, Galigher pumps are available in hard iron or stainless steel with coverings of natural rubber, synthetic rubber or plastic . . . your choice of direct or V-drives.



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Distributors in industrial centers of the U.S. and foreign countries.

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 Room 922 - Jersey City 6, New Jersey

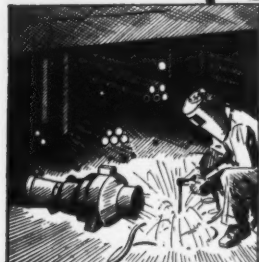
GALIGHER PRODUCTS: AGITAIR® Flotation Machine, VACSEAL Pump, Geary-Jennings Sampler, Acid-proof Sump Pump, Geary Reagent Feeder, Laboratory AGITAIR® Flotation Machine, Laboratory Pressure Filter, Laboratory Ball Mill, Rubber Lined and Covered Products, Plastic Fabrication.

SP-510

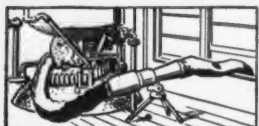
Check 3228 opposite last page



Ventilate CONFINED Places with Vano Design "C" Ventilator-Exhauster



WELDING FUMES are here removed by this Vano Ventilator-Exhauster.



FUMES FROM A REACTOR KETTLE are here withdrawn by tripod-mounted Vano Ventilator-Exhauster. Note non-collapsible suction tubing and discharge tubing.

Ideal for withdrawing welding fumes from confined places or directly from the welding rod. Provides greater safety, greater comfort for workers... leads to greater work efficiency. Can be furnished with 8" suction inlet to which 8" non-collapsible suction tubing may be attached... or provided with multiple inlet nozzles for 5", 4" and 3" suction hose.

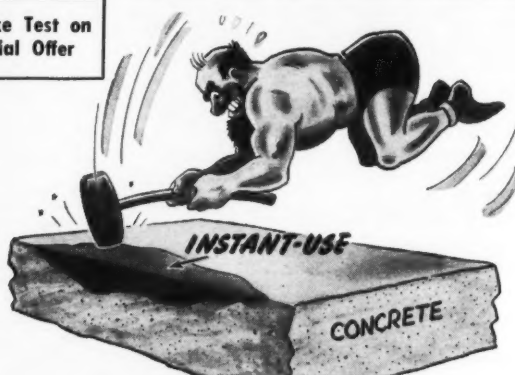
Other types are also available for supplying fresh air to men working in confined places, such as tanks, manholes, drums, boilers and ship-holds.

Coppus Engineering Corporation
387 Park Avenue
Worcester 2, Mass.



Check 3229 opposite last page

Make Test on
Trial Offer



Tough, Fast Repairs!

INSTANT SETTING FLOOR PATCH

Repair broken factory floors without the usual traffic tie-up. Simply shovel INSTANT-USE into hole or rut—tamp smooth—truck over! No waiting! INSTANT-USE bonds tight to old concrete—right up to a feather edge. It's tough. Wears like iron. Won't crack or crumble. Install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment.

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INSTANT-USE

FLEXROCK COMPANY (Offices in principal cities)
3611 Filbert St., Philadelphia 1, Pa.

Please send me complete INSTANT-USE information, details of TRIAL ORDER PLAN and Free INSTANT-USE BROCHURE—no obligation. (Clip and attach Coupon to company letterhead).

Name
Title
Company
Address



Check 3230 opposite last page

NEW LITERATURE

From page 198

Screw-conveyor drive, complete with speed reducer, packing gland, and drive shaft, is subject of 16-page bulletin. Includes photos, engineering drawings, prices, and tables to facilitate selection of units and V-belt drives for various loads and speeds. Bul A667C—Dodge Manufacturing Corporation, Mishawaka, Indiana.

Check 3231 opposite last page.

Polyethylene foam properties and various applications are extensively discussed in eight-page Bul 171-125—Plastics Department, The Dow Chemical Company, Midland, Mich.

Check 3232 opposite last page.

Automatic valves and automatic system using them are depicted and described in eight-page illustrated booklet. "Automatic Valves" Bul—G & H Products Corporation, 5718 52nd St., Kenosha, Wis.

Check 3233 opposite last page.

Dust collector, incorporating an exhaust, dust separator, and storage hopper in one unit, is outlined in 20-page bulletin. Information, concerning application, principle, design, construction, and installation, is included in Bul 272B—Department PD, American Air Filter Company, Inc., 215 Central Ave., Louisville 8, Ky.

Check 3234 opposite last page.

Linear polyolefin resin properties and applications are thoroughly discussed in 12-page Product Data Bul P1A—Plastics Division, Celanese Corporation of America, 744 Broad St., Newark 2, N. J.

Check 3235 opposite last page.

Laboratory pulverizers are pictured in four-page Bul 51F-1—Pulverizing Machinery Division, Metals Disintegrating Co., Inc., 99 Chatham Rd., Summit, N. J.

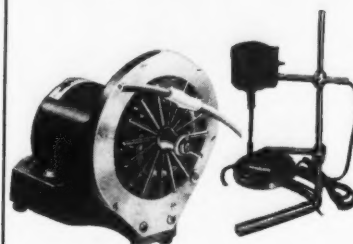
Check 3236 opposite last page.

Automatic control panels are described and illustrated in four-page brochure which lists uses of the systems. Pantro Bul—Control Panel Corporation, 517 West Monroe St., Chicago 6, Ill.

Check 3237 opposite last page.

Air pollution proceedings of national conference held last November are presented in 526-page booklet, "Proceedings, National Conference on Air Pollution", which is available at \$1.75 per copy from Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

LOW COST PUMP for Laboratory Use



- Pumps Liquids, Gases, Slurries
- No stuffing boxes
- No shaft seals
- No check valves
- Non contaminating

The New "Kinetic Clamp" Pump

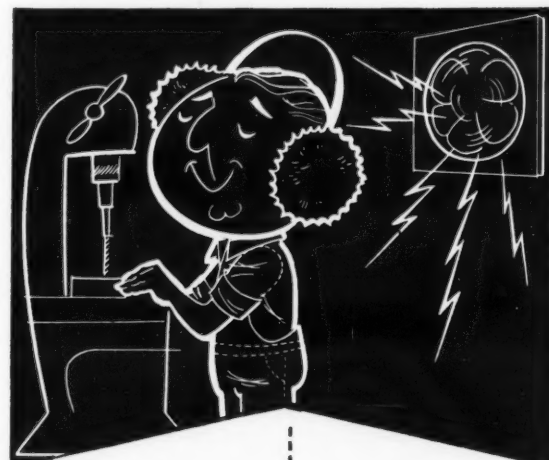
Operates by the action of radial arms successively pressing on a loop of flexible tubing. The mechanism clamps one arm against the tubing while the next arm descends to clamping position. Previous clamping arm then raises to permit tubing to assume its normal shape and again fill with liquid being moved.

Standard types of laboratory tubing in a wide range of materials provide a pumping member for almost any liquid, slurry or gas. Tubing can be changed quickly eliminating necessity of cleaning pump. There is no danger of corrosion or contamination.

Pumps can be furnished with motor or for driving from laboratory stirring motor. Write for literature and prices.

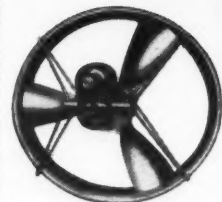
SIGMAMOTOR, INC.
18 N. Main Street • Middleport, N. Y.

Check 3238 opposite last page



Here's one way...

to solve the problem of excessive fan noise. But Hartzell Lo-Noise fans provide a much more efficient solution. For details on Lo-Noise fans in sizes from 24" to 60", send for Bulletin A-109.



HARTZELL PROPELLER FAN CO.
Div. of Castle Hills Corp.
65 Thomas Blvd., Piqua, Ohio A member of AMCA

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CHEMICAL PROCESSING

An Editorial Service — No Obligation

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JULY 1959

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2636	2685	2734	2783	2832	2881
2637	2686	2735	2784	2833	2882
2638	2687	2736	2785	2834	2883
2639	2688	2737	2786	2835	2884
2640	2689	2738	2787*	2836	2885
2641	2690	2739	2788	2837	2886
2642	2691	2740	2789	2838	2887
2643	2692*	2741	2790	2839	2888
2644	2693	2742	2791	2840	2889*
2645*	2694	2743	2792	2841	2890
2646	2695	2744	2793	2842	2891
2647	2696	2745	2794	2843	2892
2648	2697	2746	2795	2844	2893
2649	2698	2747	2796	2845	2894
2650	2699	2748	2797*	2846	2895*
2651	2700	2749	2798	2847	2896
2652	2701	2750	2799	2848*	2897
2653	2702	2751	2800	2849	2898
2654	2703	2752	2801	2850	2899
2655	2704	2753*	2802	2851	2900
2656	2705	2754	2803	2852	2901
2657	2706	2755	2804	2853	2902
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2664	2713	2762	2811	2860	2909
2665	2714	2763	2812	2861	2910
2666	2715	2764*	2813	2862	2911
2667	2716	2765	2814	2863	2912
2668	2717	2766	2815	2864	2913
2669	2718*	2767	2816	2865	2914
2670	2719*	2768	2817	2866	2915
2671	2720*	2769	2818	2867	2916
2672	2721*	2770	2819	2868	2917
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(This request form expires October 5, 1959)

**Fill in . . . mail to READER SERVICE DEPT., CHEMICAL PROCESSING
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Special subscription request-qualification form for use of

JULY 1959

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THAT'S
INTERESTING

**King-size
packaging**

A diesel locomotive is being shipped to Latin America in a polyethylene "bag." A cover custom-made by Canton Containers, Inc. of Canton, Ohio, will assure arrival of the rail giant free of scratches, dirt, and the effects of salt water spray.

Up, up

Official of Du Pont's Film Department says market for transparent packaging films may reach a billion lb by 1968. An estimated 600 million lb of film was used in 1958.

**Aluminum
on march**

An official of American Can Company's Canco Division said studies by his company indicate aluminum will have a 20% share of the metal container market within next decade.

For more information on product at right, specify 3240 see information request blank opposite last page.

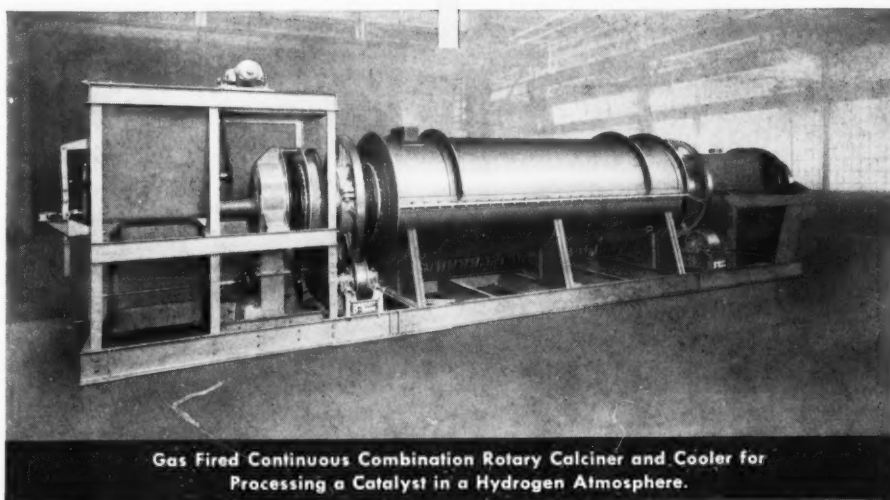


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B-SNOW**
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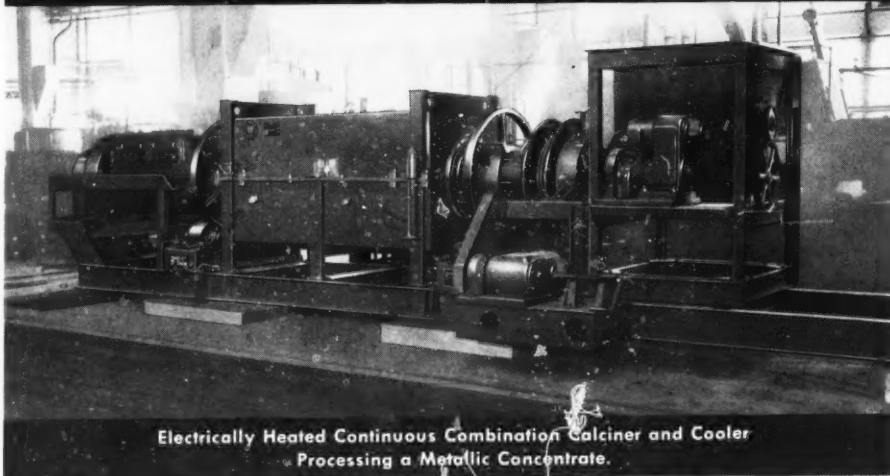
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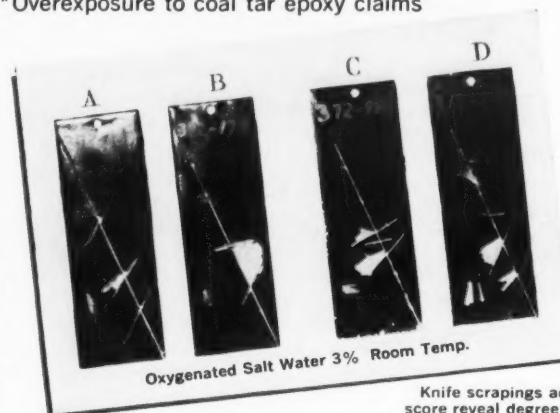
Bulletin No. 118 gives full details. Send for a copy today.



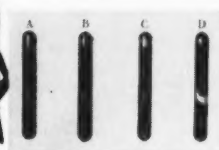
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SUFFERING FROM COALTAREPOXICATION?*

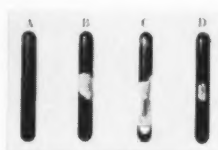
*Overexposure to coal tar epoxy claims



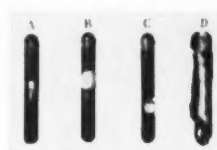
Knife scrapings across diagonal score reveal degree of undercutting.



Caustic Soda 5%
Room Temp.



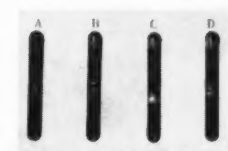
Sulfuric Acid 10%
Room Temp.



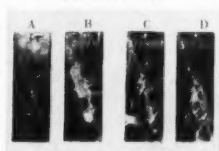
Sulfuric Acid 30%
Room Temp.



Sodium Hypochlorite 5%
Room Temp.



Aviation Gas 100/130 Octane
Room Temp.



Salt Spray (scored panels)
Room Temp.



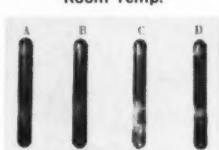
Distilled Water
140°F



Distilled Water
Boiling



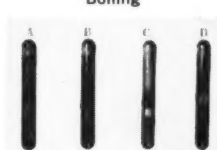
Sodium Chloride 20%
Boiling



Sour Crude
120°F



JP-4 Jet Fuel
120°F



Aromatic petroleum
hydrocarbon solvent—120°F

Try these tests to end the confusion

So many conflicting claims have been made about virtually every coal tar epoxy coating on the market that prospective users are finding it difficult to fish out the facts from a sea of superlatives.

Perhaps you can find *your* answer by duplicating any or all of these laboratory tests comparing the four leading coal tar epoxies.

THE TESTS: The rods and panels illustrated here were carefully coated to the four manufacturers' specifications and then subjected for three months to the corrosive agents indicated above. The wide range of tests included varying concentrations of chemicals, ambient and elevated temperatures, weathering and all usual types of exposure.

THE RESULTS: Some results were predictable, such as the failure of all four coatings to withstand aromatic petroleum hydrocarbon solvent. But striking differences occurred in such tests as oxygenated salt water, when only Coating A (Amercoat No. 78) resisted undercutting. Products B, C and D were all blistered and undercut to varying degrees. In none of the remaining tests was Amercoat No. 78 excelled, and in most cases it showed marked superiority.

CONFIRMATION: The properties attributed to No. 78 in these tests have been substantiated repeatedly in actual field use. Applicators like it because it (1) gives dependable, all-around protection, (2) sprays more easily than competitive products, (3) builds thick films without difficulty because of its higher solids content, and (4) dries thoroughly but at a moderate rate, avoiding the extremes of prolonged tackiness and fast-dried brittleness.

Because of the unusual importance of these tests to prospective users of coal tar epoxy coatings, we have prepared illustrated copies of the complete report. Write for yours today!

(Amercoat No. 78 was formerly designated No. 1686)



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